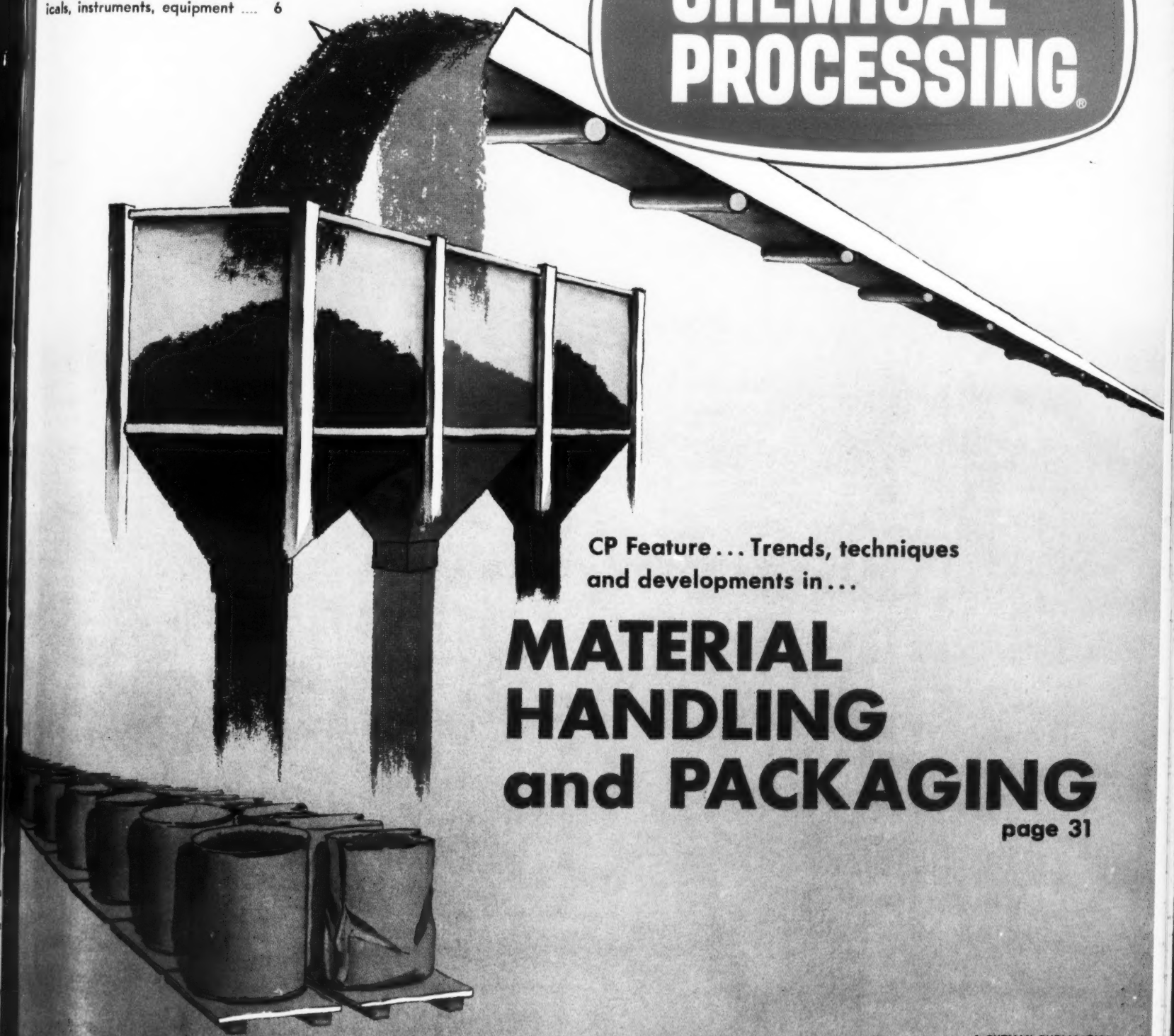
Flash drying cuts starch processing time from hours to minutes 28

Gas chromatography speeds analysis of process streams; accuracy up 135

... also more than 240 terse reports on new processing techniques, chemicals, instruments, equipment 6

MAY 1959

CHEMICAL PROCESSING®



CP Feature ... Trends, techniques and developments in ...

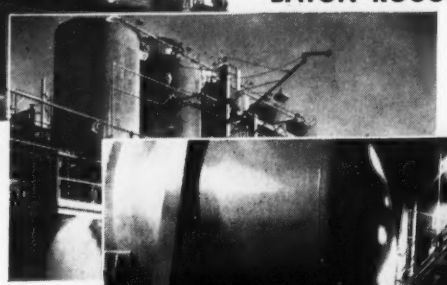
MATERIAL HANDLING and PACKAGING

page 31

A PUTMAN PUBLICATION
"Executive Magazines for Industry"

1 NORTH CLAYMONT, DEL.

BATON ROUGE, LA.



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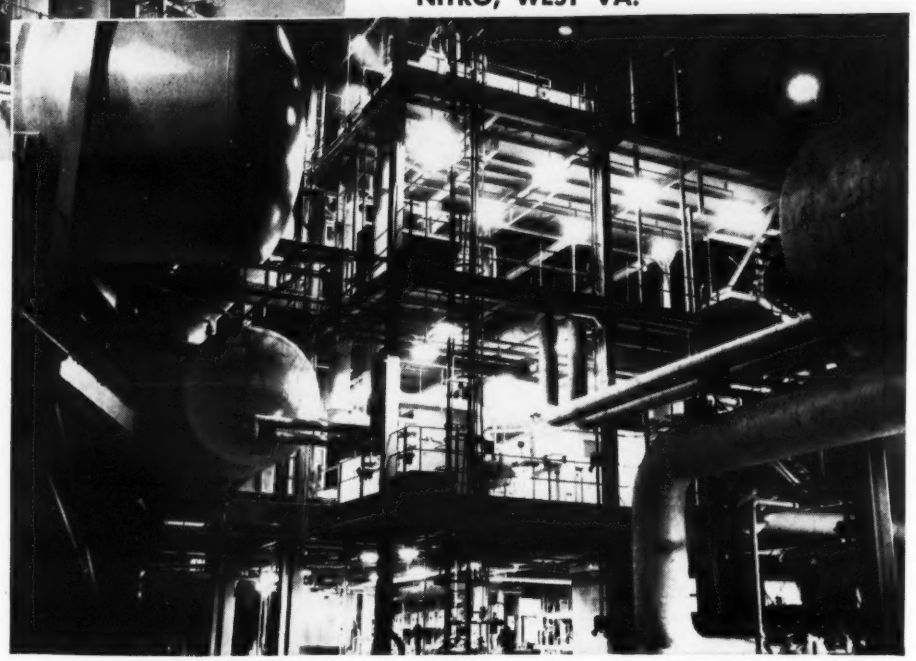

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Your "HQ" for ANHYDROUS HF!

(and 8 reasons for 70% Aqueous HF)

First North Claymont, Del. . . . then, Baton Rouge, La. . . . now Nitro, West Virginia! General Chemical is now supplying anhydrous HF to its customers from *three* producing works and aqueous HF (tank cars and drums) from an additional *five* company-owned locations. These five aqueous HF bulk storage and packaging stations are located at Buffalo, N.Y.; Chicago, Ill.; Cleveland, Ohio; El Segundo (Los Angeles), Calif.; and Pittsburgh, Pa.

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Your most dependable source for HF!

Allied Chemical's General Chemical Division is America's primary producer of hydrofluoric acid and the *only* supplier offering shipment from more than one producing location. Also important to you are General Chemical's extensive resources for essential raw materials—your best protection against interruptions of supply. General owns a large number of fluorspar mines and operates its own mills . . . and, of course, a broad network of sulfuric acid plants. That's why it's wise to make General *your HQ for HF!*

Basic to America's Progress

Allied Chemical

GENERAL CHEMICAL DIVISION

40 Rector Street, New York 6, N. Y.

Check 1523 opposite last page

conventions and exhibits

May 3-7. The Electrochemical Society, Inc., meeting, Sheraton Hotel, Philadelphia.

May 4-8. American Petroleum Institute, Safety and Fire Protection Committee, 12th Midyear Meeting, Rice Hotel, Houston.

May 6-8. American Institute of Chemists, Annual Meeting, Hotel Traymore, Atlantic City.

May 7. Armour Research Foundation and the Electrochemical Society, Corrosion Inhibitors Symposium, Illinois Institute of Technology, Chicago.

May 10-13. American Institute of Chemical Engineers, meeting, Kansas City, Missouri.

May 11-12. American Coke and Coal Chemicals Institute, Eastern Regional Meeting, Westchester Country Club, Rye, New York.

May 11-13. Synthetic Organic Chemical Manufacturers Assn., meeting, Cavalier Hotel, Virginia Beach, Virginia.

May 14-23. International Petroleum Exposition, Tulsa, Oklahoma.

May 17. American Society for Testing Materials, Seventh Meeting on Mass Spectrometry, Statler Hilton Hotel, Los Angeles.

May 17-20. American Institute of Chemical Engineers, National Meeting, Hotel Muehlebach, Kansas City, Missouri.

May 18-20. Instrument Society of America, 5th Annual Symposium on Instrumental Methods of Analysis, Shamrock Hilton Hotel, Houston.

May 20-21. Chemical Market Research Association, meeting, Plaza Hotel, New York.

May 25-26. Commercial Chemical Development Association, Annual Resort Meeting, Pocono Manor, Penna.

...Meetings and shows of interest to the chemical industries

May 25-27. American Society for Quality Control, Annual Convention and Exposition, Public Hall and Hotel Sheraton, Cleveland.

June 1-5. Fifth World Petroleum Congress Exposition, Coliseum, New York.

June 2-4. Appalachian Underground Corrosion Short Course, University of West Virginia, Morgantown, West Virginia.

June 9-12. The Material Handling Institute's Exposition of 1959, Public Auditorium, Cleveland.

June 10-12. Instrument Society of America. Second International Symposium on Gas Chromatography, Kellogg Center for Continuing Education, E. Lansing, Mich.

June 15-19. Course on the Theory and Design of Biological Waste Treatment, Civil Engineering Dept., Manhattan College, Riverdale, New York.

June 22-24. American Society of Refrigerating Engineers, Annual Meeting, Lake Placid Club, Lake Placid, N. Y.

September 13-18. American Chemical Society, National Meeting, Atlantic City.

September 21-25. 14th Annual Instrument-Automation Conference and Exhibit, International Amphitheatre, Chicago.

September 27-30. American Institute of Chemical Engineers, meeting, St. Paul, Minnesota.

September 28-30. American Oil Chemists' Society, meeting, Hotel Statler, Los Angeles.

October 18-22. The Electrochemical Society, Inc., meeting, Deshler-Hilton Hotel, Columbus, Ohio.

October 20-24. Federation of Paint and Varnish Production Clubs, 37th Annual Meeting and the 24th Paint Industries' Show, Lower Hall of Convention Hall, Atlantic City.

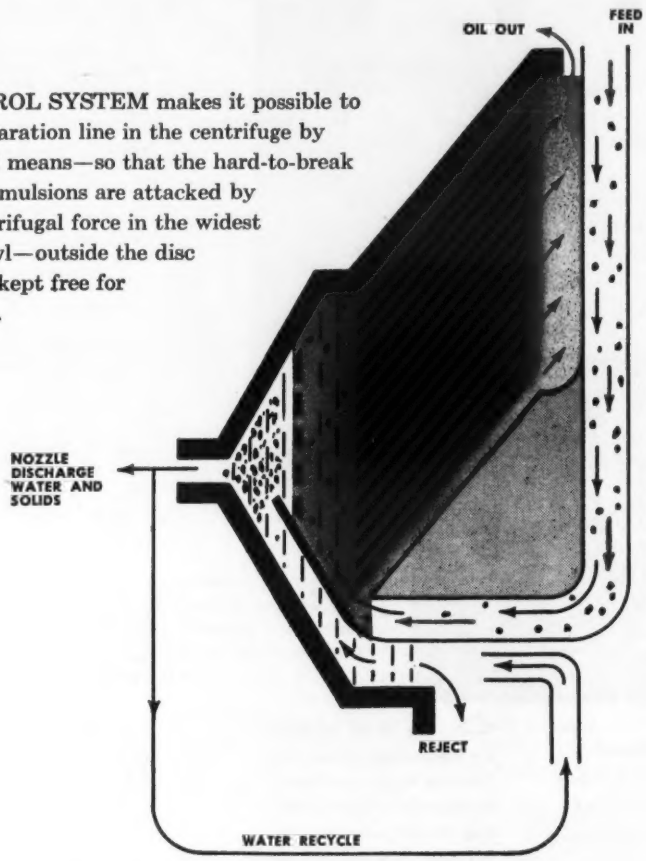
NO OILY SLUDGE DISCHARGE...

When you Purify Heavy Industrial Oils by the Sharples GRAVITROL* SYSTEM

you handle only:

- **CLARIFIED OIL**
- **OIL FREE SOLIDS** which settle out in the water phase and are consequently "washed free of oil". These solids are easily disposable.

The GRAVITROL SYSTEM makes it possible to control the separation line in the centrifuge by simple external means—so that the hard-to-break oil and water emulsions are attacked by maximum centrifugal force in the widest part of the bowl—outside the disc stack which is kept free for oil purification.



The GRAVITROL SYSTEM *eliminates* "hard-to-dispose-of" oily sludges and oil losses to the solids, as well. Installations handling tank bottoms, residual fuel oils, steel mill lubricating oils and the like, show high reclamation rates in continuous "labor-free", around-the-clock operation, high purity of the oil and easily disposable solids discharge—all of which add up to a quick "pay-out".

*Patents Applied For

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Check 1524 opposite last page

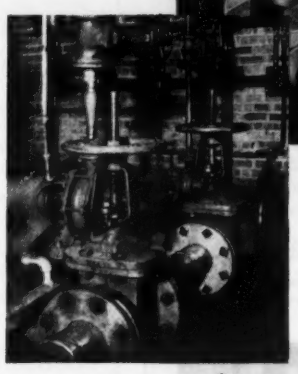
In Formaldehyde Service Like This...

CHEMLON® RINGS

give more than twice the life of other packings

This report was made by the Spencer Chemical Co.'s Chicago Works on their Type 316 stainless steel valves handling 45% formaldehyde solutions with a pH as low as 3.5. Previous to the installation of Chemlon Molded Rings, packing life had been limited to six months. The Chemlon Rings have been in service over 1 year and continue to stand up well.

HERE AGAIN IS PROOF THAT CHEMLON PACKINGS ARE THE POSITIVE ANSWER TO *YOUR* TOUGH-TO-HANDLE CORROSIVE AND TOXIC LIQUID PROBLEMS AT TEMPERATURES FROM —120° TO +500°F. AND WITHOUT FEAR OF PRODUCT CONTAMINATION.



Photograph courtesy of Spencer Chemical Co.

Chemlon Packings are fabricated from DuPont Teflon. Machined and molded types are supplied in ring form and are available with square or beveled ends or in odd shapes for special fittings.

Tell us about *your* problems or requirements. Request Bulletin P-325.

The ability of these stainless steel valves and Chemlon Rings to withstand the formalin solution contributes to the extremely low 0.2 ppm. avg. iron content of Spencer's formaldehyde.

Crane Packing Company, 6421 Oakton Street, Morton Grove, Illinois, (Chicago Suburb).

In Canada: Crane Packing Co., Ltd., Hamilton, Ont.

CRANE PACKING COMPANY

Check 1525 opposite last page

CHEMICAL PROCESSING

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

For the management team

More than 50,000 copies of this issue

Vol. 22 May 1959 No. 5

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Editorial Staff—page 6
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over the editor's shoulder

Accent on handling and packaging

"Package-filling accounts for approximately 95% of all handling costs in the chemical industry." So states Dow's C. H. Wolf in his article on page 32, this issue. And it's common knowledge that total material handling costs are a sizeable expense item in the industry.

So it comes as no really big surprise that both Mr. Wolf and American Cyanamid's R. F. Uncles (page 33) foresee broader horizons for the material-handling and the packaging engineer. Cost-conscious CPI management is starting to put the specialized knowledge of these professionals to work in plant and process design, purchasing, distribution . . . and even customer service.

Each of these articles is well worth your reading time. Both authors use a good deal of "educated imagination" in sizing up future trends in material handling and packaging procedures, management, and equipment. Each speaks from a wealth of experience in industry.

You'll find other brainfood, too, in this month's Feature Section on Material Handling & Packaging. It's packed full of case histories, telling "how it was done better," and news of the latest developments in equipment and supplies. (See page 31.)

Back to trends . . . don't miss the sum-up of a recent survey on bulk conveying on page 40. The survey, by our company's Research Department, reports what CPI material-handling men see for the future of bulk-handling equipment.

Dana B. Berg

Managing Editor

P.S. Don't forget the Material Handling Institute's Exposition, Cleveland, June 9-12!

Mr. Processing Engineer:

Why use this much pulverized carbon?

. . . when this much Pittsburgh Granular Carbon will do the same job better!

DOES your plant operate a batch-type adsorption process with pulverized activated carbon? If so, you should investigate the outstanding cost and performance improvements now made possible by converting to a continuous column system with Pittsburgh *Granular* Activated Carbon.

The contrast in consumption of carbon alone is often dramatic. One company which recently converted to Pittsburgh Granular Carbon reported a five-fold reduction in carbon dosage, as illustrated above . . . *and* a cost saving of more than 3 to 1.

The other advantages of a continuous column system with Pittsburgh Granular Carbon are equally impressive: Greater capacity, higher product quality, cleaner operation, less equipment and lower maintenance, to name just a few.

Our technical representatives will be glad to help you set up a small scale laboratory column to help you evaluate the benefits of using Pittsburgh Granular Carbon in *your* adsorption system. *Write today for more information.*

FREE BOOKLET

Describes types and various applications of Pittsburgh Activated Carbons, in both liquid and vapor phase adsorption. For your free copy, write to Dept K.

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Check 1526 opposite last page

highlights

CHEMICAL BUSINESS

Pro and Con on Right to Work 25
Computer Helps Plant Scheduling — J. I. Morgan 26
Intelligent Approach to Personnel Testing 27

NEW PROCESSING TECHNIQUES, MATERIALS and EQUIPMENT

NEW SOLUTIONS OF PROCESSING PROBLEMS

Flash drying of corn starch improves quality 28
Electricity provides even heat for 200-gal reactor 30
One-ppm water produced by distillation units 66

MATERIAL HANDLING & PACKAGING — Feature Section

Thirty-six pages of latest trends, techniques, developments for chemical processing plants 31

CHEMICAL MATERIALS

Butadiene-based polymers help 'tailor' specialty papers 81
Unusual solubility displayed by surface-active agent 90

U. S. and WORLD PETROCHEMICALS

Dryers using activated alumina keep plant on stream 99
Storing ammonia at atmospheric pressure saves money 103

IDEAS

Paper machine produces 500 tons foodboard per day 123
Radiation lab has king-size 'hot' room 130

PROCESS INSTRUMENTATION & LABORATORY APPARATUS

Chromatography units improve accuracy, speed analyses 135
Infrared monitoring helps hold ammonia process efficiency 146

CORROSION CONTROL

Bi-metal couplings five times faster, resist corrosion 151
H_2SO_4, HCl corrosion battled by fatty nitrogen derivatives 152
Titanium-palladium alloy has broad corrosion resistance 158

PROCESSING EQUIPMENT

Anti-oxidant blended swiftly with vortex-free mixer 164
High efficiency reported for fractionation trays 167

PLANT ENGINEERING, MAINTENANCE & SAFETY

Shower and eye-wash combination improves plant safety 176
Heavy lime dusting halted with collector 184

CHEMICAL PROCESSING

MAY 1959

VOLUME 22 • NUMBER 5

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THIS MONTH'S COVER

Last year, in our March issue, we featured Material Handling. In this issue we are spotlighting Material Handling **and** Packaging. This "combination" is logical since these two subjects are becoming more closely intertwined every day, especially in the chemical processing industries. Fact is that receiving, storing, moving, packaging, loading, and shipping operations are getting a fresh look from management at all levels today. It's worth your time to check the feature for trends, techniques, and developments that may help you solve your handling and packaging problems. See page 31.

REGULAR FEATURES

Conventions & Exhibits	2	Nuclear Notes	19
Letters from Readers	7	Engineering Data	71
Our Growing Industry	11	Recent Books	192
Spotlight on People	13	New Literature	196
Watching Washington	15	Advertisers Index	215

SPECIAL READER SERVICES

• For more information on articles and advertisements in this issue, check the Reader Service slip opposite last page

• To subscribe to this magazine see reader-qualification form opposite last page

letters from readers

Assails Lobstein's education ideas

Dear Sir:

Ideas proposed by Lobstein (February CP, page 28) would aid materially in curtailing free enterprise and in extending socialism. The general technology developed by industry is already made available to university faculties in trade and technical publications and in greater quantities than can be utilized in teaching.

To provide detailed information on industrial research and trade secrets to universities would serve no useful purpose, and could result in economic suicide.

Sharp Distinction

There is a clear-cut distinction between basic and applied research. Many prominent educators and industrial scientists have adequately defined these areas. We must realize that applied research is an outright professional business activity the same as accounting, law, or medicine.

Applied research is not a proper function for any tax-supported or tax-favored university or college, for it reduces the effectiveness of the primary educational function, it forces taxpayers to subsidize development work for a sponsor's exclusive use, it dilutes efforts in important basic research activities, and it provides unnecessary and unfair competition to established independent research organizations providing the same service.

Experience Essential

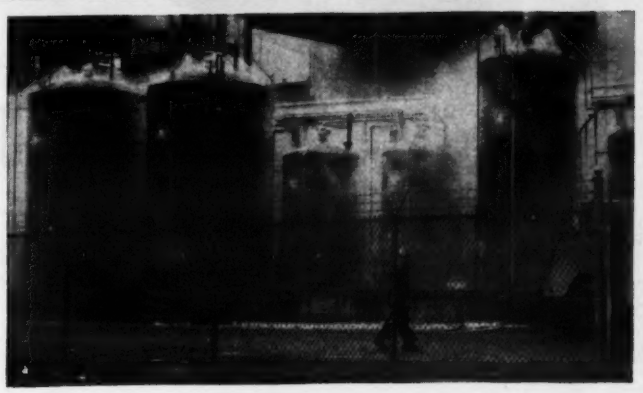
If it is necessary for faculties and students to be familiar with applied research in each industry, then it is also necessary that they have experience in actual manufacturing operations.

Therefore, if we follow Lobstein's philosophy, we should have universities in all types of manufacturing businesses. This would provide the same tax-favored, publicly subsidized competi-

Two ways of providing
EXPOSURE PROTECTION

TOO LATE ▲
to prevent serious heat exposure, a valiant attempt is made by firefighters to prevent rupture of tankage, not already involved in flames, with relatively ineffective hose streams.

GRINNELL WATER SPRAY SYSTEM ▶
shown under test at the Marietta, Ohio plant of the Bakelite Union Carbide Plastic Company, a division of the Union Carbide Corporation. Water – when it is applied in time and distributed over the surfaces efficiently by a properly engineered system – is most effective in limiting tank fires and controlling their spread.



Proper safeguards are uppermost in importance in protecting tanks which contain gases and flammable liquids in the event of fire. For example, tanks must be guarded against extreme heat exposure. Leaking gas, if it should develop, must be diluted to the point where it will not burn. And fire, if it should occur, must be localized and controlled or extinguished.

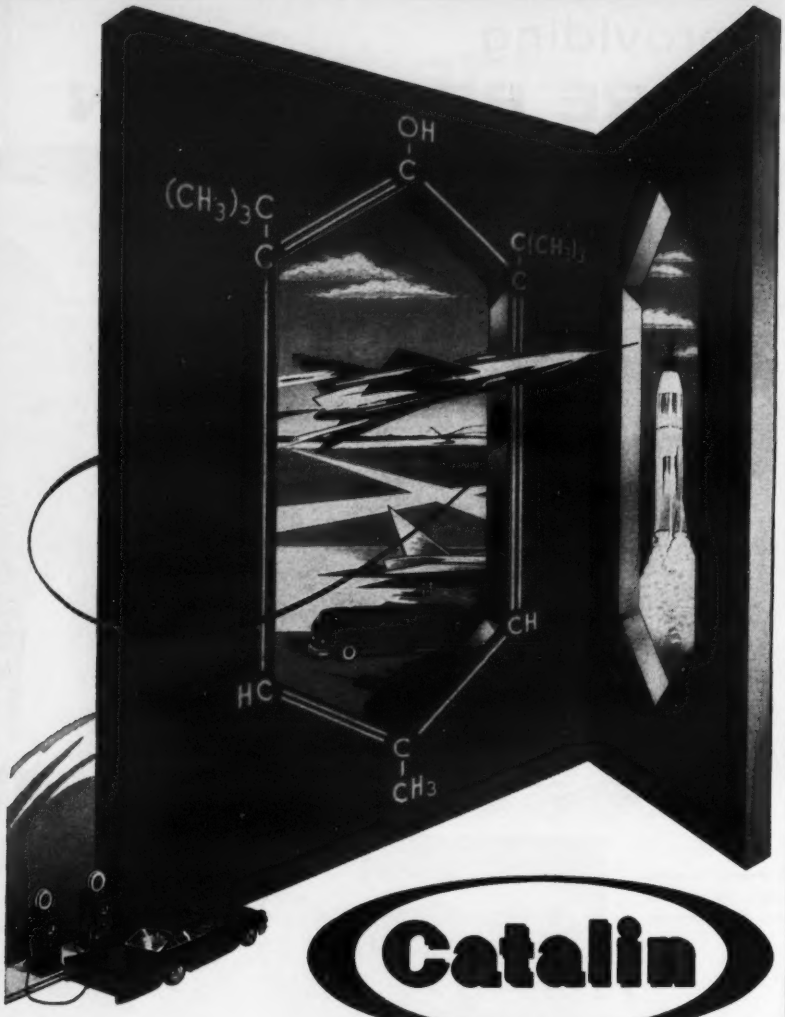
With a Grinnell Water Spray System, you get protection against all these eventualities.

Before heat raises tank temperatures dangerously, an enveloping spray of water provides instant cooling, reducing internal pressure which helps prevent rupture. In addition, air turbulence is created (even in still air) which, in conjunction with the water vapor from the spray, helps dilute the flammable vapors controlling or extinguishing the fire. Flammable products which cannot be safely extinguished can be burned off under the protecting water spray with no damage to adjacent protected equipment.

There is a Grinnell Fire Protection System for every fire hazard. Call on Grinnell for advice about the one suited to your needs. Grinnell Company, Inc., 277 West Exchange Street, Providence 1, R. I.

GRINNELL FIRE PROTECTION SYSTEMS SINCE 1870

Check 1527 opposite last page



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antioxidant CAO-1

98.9% PURE* / sets the highest standards for purity and effectiveness

Catalin ANTIOXIDANT CAO-1 . . . the field's finest grade of 2,6-ditertiary-butyl-para-cresol . . . meets U. S. Government military specifications for use in aviation gasolines, turbine and jet fuels. A major advantage achieved with this heat-resistant, water-insoluble antioxidant is that high-octane fuels are effectively protected, with no loss of octane rating. Gum and peroxide formations are inhibited, and deposits in the aircraft intake manifold and engine are markedly reduced.

Catalin ANTIOXIDANT CAO-1 stabilizes high-octane automotive gasolines, as well as turbine, insulating, hydraulic and transformer oils . . . in fact, nearly any petroleum hydrocarbon exposed to oxidizing conditions.

Samples, literature and technical assistance wait upon your request. Inquiries invited.

Catalin Corporation of America
One Park Avenue, New York 16, N. Y.

chemicals / plastics / resins

*Typical Analysis

Check 1528 opposite last page

LETTERS

tion for any given industry. Eventually we could bring about a collapse in our economic structure (for there is no one left to pay taxes) and some form of complete socialism could assume full control.

Let us support our universities by improving salary schedules and working conditions. They can then carry out their primary functions of education and basic research for the benefit of all without need for operating applied research or manufacturing businesses. The argument that universities need more experience in applied research is without foundation of fact.

LEWIS E. HARRIS
President
Harris Laboratories, Inc.
Lincoln, Neb.

Readers slug it out with Chaldron Ell Slug

Chaldron Ell Slug, perpetrator of the "barleycorn," "butts," "noggin" letter on constants is being backed against the wall. Readers are throwing down the gauntlet with constants that run the gamut. Can you top this latest crop?

Dear Sir:

It was a pleasure to discover in your February issue (page 7) that engineers at General Electric are using some dimensions which we have advocated for many years.

It was particularly gratifying to note the use of scruples/firkin to describe density.

We always specify that our product, "Hexamethyl chickenfat," be shipped to our customers at a density of 27,100 scruples/firkin ($\pm 22.3 \times 10^{-7}$ long tons/peck, or $\pm 2.9 \times 10^{-7}$ stones/minim).

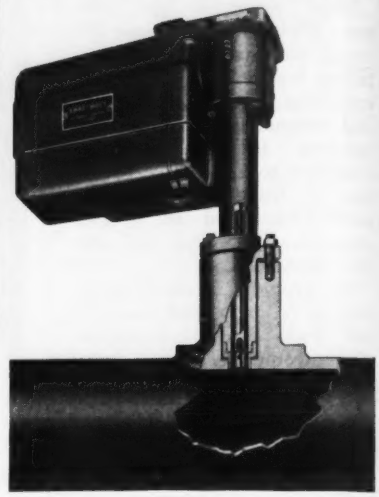
However, the water in Schenectady must have a tendency to produce lightheadedness. Here in Tennessee, water at 3.98°C has a density of 26,491 scruples/firkin.

Our firkins contain 34.06799 liters, and our scruples, while not the best, weigh in at 1.286 grams.

J. D. WRAY
Nashville, Tenn.

Great things are happening in AutroniC® Control

TOUGH PROBLEMS ARE NO PROBLEM



FOR THIS FOOLPROOF, FOUL-PROOF PRESSURE TRANSMITTER

Here is a primary sensing element for those tough jobs you'd like to forget. Mounted right on the process pipeline or tank, the Swartwout Flush Diaphragm Pressure Transmitter will effortlessly measure pressure or liquid level of polymers, slurries, asphalts, viscous fluids, molten metals and other difficult media. No stagnant pressure lines, no steam jacketing necessary . . . the stainless steel transmitter diaphragm fits flush with the inside of the vessel.

A friction-free linkage multiplies diaphragm motion and actuates the core of a differential transformer to produce a 0-0.5V AC signal for any Swartwout AutroniC indicator, recorder or controller. Sensitivity is better than 0.005%, reproducibility 0.1%, accuracy 1.0%.

The Flush Diaphragm Pressure Transmitter is just one unit in the constantly-growing AutroniC family of electronic instrumentation . . . a family that includes all necessary components for complete electronic control of any process parameter.

For details on the Flush Diaphragm Pressure Transmitter, request Bulletins A-713 and A-718. The Swartwout Co., 18511 Euclid Ave., Cleveland 12, Ohio.

SWARTWOUT

. . . world leader in electronic process instrumentation

S-A. 1988

Check 1529 opposite last page

Dear Mr. Vaaler:

Just saw "Caught with your constants down?" in February issue, and couldn't resist replying.

The important thing, I believe, is to get back to basics, and I append a list of basic units. For those who must convert to outmoded systems, there are conversion factors.

Time: the coffeebreak; one cb= 11.63 sidereal minutes.

Temperature: the Monroe; one °M=113.4°F=63°C= the rise in temperature from normal blood heat to the boiling point.

Length: the parkingspace; one ps =0.732 times the length of the average American auto=ca. 15.1 ft.

Time (long interval): the wife-ready; one wr=10^{10} cb.

Mass: the pantslead; one pantslead=1.27 kg=2.684 lb.

Energy: the potboiled; one potboiled (pb)=300 Btu (=heat required to heat a quart of water from rt to bp.)

Power: one pb/cb=0.607 hp.

Sound intensity: the rowdy; 1 rdy =0.63 bel. One baby=0.001 rowdy; 1 fishwife=1000 rowdies.

And so on. In this system, thermal conductivity would, of course, take on the units: pb/ps², cb (°M/ps). The rest is obvious. The speed of light = 45.4 megaps/millicb.

JIM CARLEY
Engineering Editor
Modern Plastics
New York 22, N. Y.

Dear Editor:

Chaldron Ell Slug's "Variable Constant System" discussed in your December issue is, of course, only an elementary approach. A true variable constant retains a definite recognizable form but subtly varies in dimension at the will of the user. Illustration by example will show the superiority of the advanced method.

The commonly used .0000368 acre inch/minute (sometimes referred to as GPM is easily expressed as a true variable constant.

.0000368 AIM = .01114 Miners Inch (Ariz., Calif., Mont., Ore.) = .00891 Miners Inch (Idaho, N. M., N. D., S. D., Kan., Neb.)

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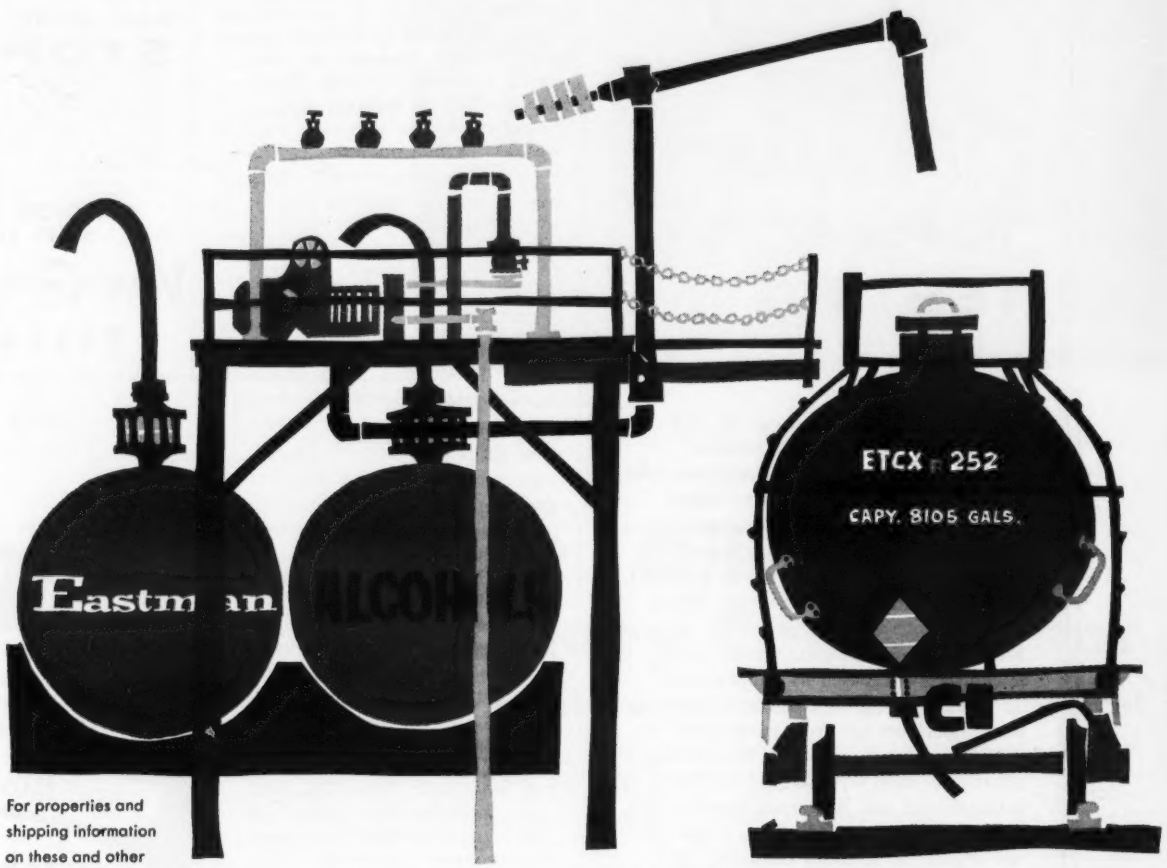
ethyl alcohol
95% and anhydrous

Tecsol®
proprietary ethyl alcohol

isobutyl alcohol

2-ethylhexyl alcohol

2-ethylisohexyl alcohol



For properties and shipping information on these and other Eastman products, see **Chemical Materials Catalog,** page 357 or **Chemical Week Buyers Guide,** page 85.

Eastman alcohols are available in bulk from major industrial centers. For samples or specifications, write or call your nearest Eastman representative.

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KINGSPORT, TENNESSEE, subsidiary of Eastman Kodak Company

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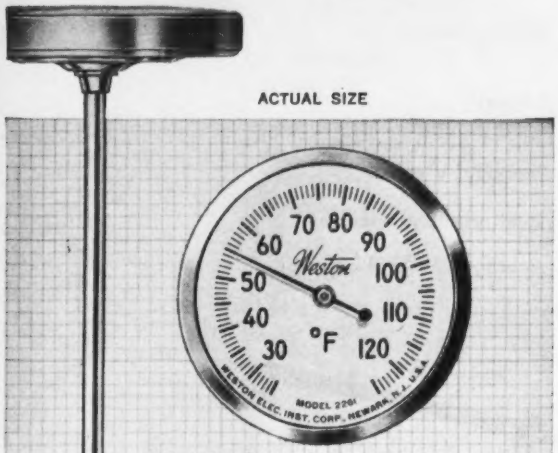
Check 1530 opposite last page

WESTON THERMOMETERS: STANDARDS OF STABILITY IN SCIENCE AND INDUSTRY



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Model 2261 Bimetals are

TOPS FOR TESTING

Here's the ideal thermometer for lab or industrial testing. It offers consistent accuracy in the face of general abuse. Like all Weston bimetals, its sensitive helical element is characterized by exceptional structural stability and fast, dependable thermal response. This results in excellent readability and assured accuracy within ½ of 1% of the full thermometer range. Except for the scale glass, Model 2261 is completely encased in stainless steel. 16 standard ranges are available covering the temperature spectrum from −100° to 500°F or −100° to 250°C. Weston also offers spike stem versions for food testing or internal oven use. Abnormal temperatures up to 50% over or under scale range will not impair the accuracy of Model 2261.

For further information, consult your local Weston representative, or write to Weston Instruments, Division of Daystrom, Inc., Newark 12, N. J., *In Canada: Daystrom Ltd., 840 Caledonia Rd., Toronto 10, Ont. Export: Daystrom Int'l., 100 Empire St., Newark 12, N. J.*

WESTON *Instruments*

A DAYSTROM UNIT

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LETTERS

= .00855 Miners Inch (Colo.)
= .00802 Miners Inch (British Columbia)
or = .01114 MI = .00891 MI = .00855 MI = .00802 MI

In use, the repetitive term "Miners Inch" impresses itself upon reader or listener, while the dimensional variation slides by unnoticed. A similar but slightly unethical system uses abbreviations.

Calculations involving CFM can be 100% correct mathematically yet have approximately 25% error in result if CFM is defined as Cylindrical Feet/Minute instead of the more customary Cubic Feet/Minute. Flow through cylindrical pipes is logically expressed in this manner.

Engineers interested in this system are advised to develop familiarity with variable constants particularly suited to the line of work in their temporary employment.

JOHN R. SHAW
Supervisor, Engineering
Production Department
Chemical Plants Division,
Blaw-Knox Company
Pittsburgh 22, Pa.

Ooops, we slipped

Dear Sir:

. . . I sent a nomograph of a gas-flow equation that is published in the February 1959 issue of CHEMICAL PROCESSING, page 47. Your attention is called to an error in the literature citation. This was not presented by me at the AGA meeting described, but by Clark Bros. Co., Inc.

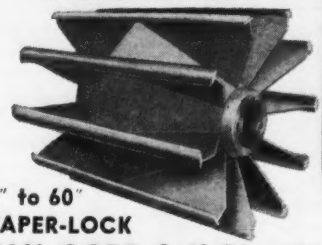
In checking the original of this chart I see how your misapprehension occurred. My name appears in the lower right-hand corner, directly under the statement that the paper was presented at the AGA meeting.

Out of concern for a possible objection by Clark Bros., I believe it would be wise to publish a statement to this effect in your magazine.

FRANK P. VANCE
Idaho Falls, Idaho

(Editor's Note: *We appreciate Mr. Vance's concern, as we are sure Clark Bros. does.*)

Use VAN GORP *Turn-Clean* PULLEYS



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VAN GORP *Self-Cleaning* PULLEYS
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Van Gorp Self-Cleaning Pulleys offer individual wing construction that prevents any material build-up between the belt and pulley. Self-cleaning cone design automatically discharges foreign material to the sides of the pulley. It is no longer necessary to spend valuable time cleaning material from belt or pulley. Van Gorp Pulleys stay clean and insure proper belt alignment. Reduce your maintenance costs! Be sure you specify Van Gorp TURN-CLEAN Pulleys with Dodge TAPER-LOCK bushings on all your conveyors or bucket elevators.

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Check 1533 opposite last page

380-million-lb Ethylene Plant Planned by Mobil Oil in Texas

Mobil Oil Company, newly created operating division for the United States and Canada of Socony Mobil Oil Co., Inc., is planning immediate construction of a high-purity 99.8 + % ethylene plant with annual capacity of 380 million lb.

Plant will be built and operated in Beaumont, Texas, by the Magnolia Petroleum Co., the Mobil Company for southwestern United States. It will be built in several stages. First stage will represent an investment of approximately $25 million.

M. W. Kellogg will be general contractor. Plant is scheduled to go on stream early in 1961.

Besides ethylene, plant will produce propylene and butadiene.

Dixon Chemical Industries, Inc., a corporate affiliate of Dixon Chemical & Research, Inc., has begun construction on a 300,000-ton/year sludge-burning sulfuric acid plant at the site of its I. P. Thomas division plant at Paulsboro, New Jersey.

The new plant, representing a $5-million investment, is the initial step in a major expansion program for Dixon Chemical Industries. It is expected the facility will be in operation in September.

Chemical Construction Co. is building the plant. Singmaster & Breyer, consultants to Dixon Chemical, is providing overall supervision.

Construction is expected to begin this year also on a $2-million aluminum sulfate plant with 40,000-ton capacity. It will be built in Newark, N.J.

AviSun Corporation has been established as an equally owned affiliate of American Viscose Corporation and Sun Oil Company. It is scheduled to be the nation's second and largest commercial supplier of polypropylene by mid-summer.

Sun Oil has developed a process to manufacture polypropylene resins. American Viscose has developed new processes to manufacture polypropylene film and fibers.

AviSun will be an integrated company to manufacture, process, and sell resins, film, fibers, elastomers, surface coatings, and adhesives using olefin polymers or copolymers with other substances.

Koppers Company, Inc. has leased facilities at its Port Reading, N. J., linear polyethylene plant for production of polypropylene resin. Commercial quantities are expected to be available by midsummer from a modified line at the plant. Capacity of the converted plant is estimated to be 20 million lb/year.

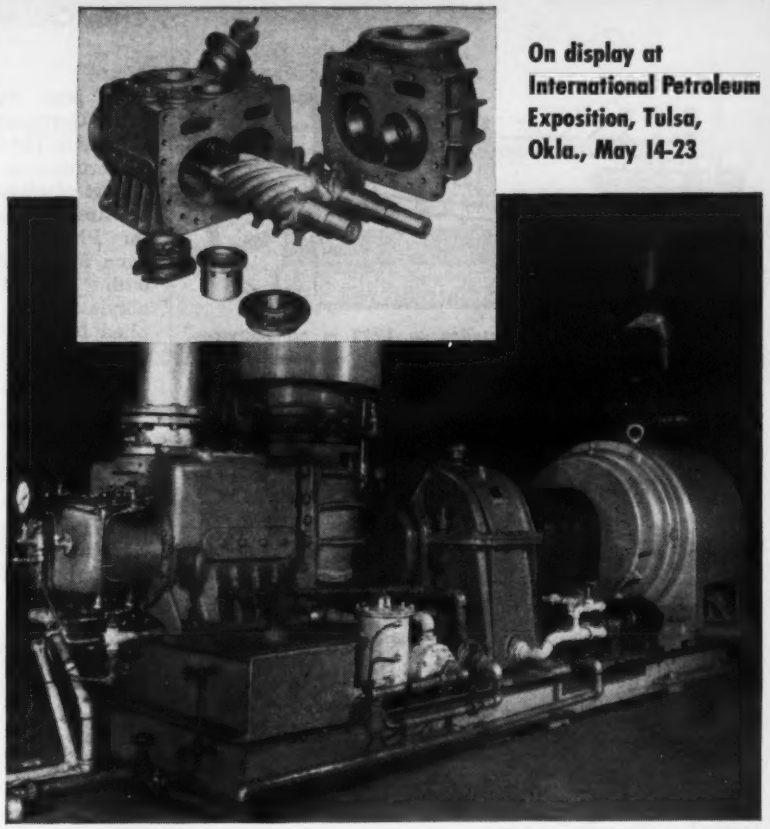
Seiberling Rubber Co. is building a 20,000-sq-ft addition to its Plastics Division plant at Newcomerstown, Ohio. Scheduled for completion soon, the addition will provide new production space, laboratories, and office area. Gundy Construction Co., New Philadelphia, Ohio, is the contractor.

Solar Nitrogen Chemicals, Inc. has been formed as a company jointly owned in equal proportions by Standard Oil Company (Ohio) and Atlas Powder Company.

The new company will manufacture and sell agricultural and industrial chemicals. It will acquire all of Sohio's ammonia and related petrochemical facilities at Lima, and will succeed to the business conducted by Sohio in these products.

Sohio Chemical Company, a wholly owner subsidiary of Standard Oil (Ohio), will continue to operate the plant and to act as sales agent for the new company.

Petro-Tex Chemical Company announces completion of a 3000-bpd sulfuric acid alkyl-



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NEW *Fairbanks-Morse Positive Displacement Axial-Flow...*

Oil-Free Rotary Compressor

for pressure, vacuum or booster service!

Here is a mechanically-simple, precision-built, high-efficiency compressor that combines the best features of reciprocating and centrifugal designs!

The new Fairbanks-Morse Axial-Flow Rotary Compressor is a two-impeller helical-lobe type machine ...ideal for a wide variety of applications...smooth in performance, adaptable to any power source. Unit weights and space requirements are impressively low.

Standard models are available in single-stage units with capacities from 800 to 12,500 cfm. at compression ratios from 1.6:1 to 5.0:1—or in two-stage units with capacities from 2,000 to 12,500 cfm. at compression ratios above 5.0:1—and for booster service at maximum working pressures up to 250 psig.

Contact your nearby Fairbanks-Morse Branch, or write Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 5, Ill.

Ask for new Bulletin ACO 100.1.

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COMPRESSORS · PUMPS · SCALES · DIESEL, DUAL FUEL AND GAS ENGINES
LOCOMOTIVES · ELECTRIC MOTORS · GENERATORS · MAGNETOS · HOME WATER SYSTEMS

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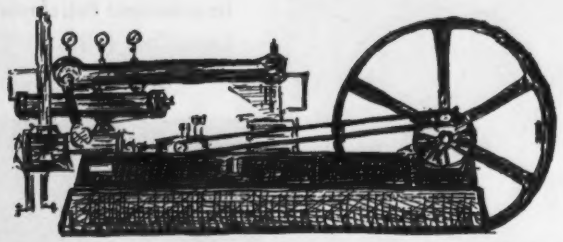
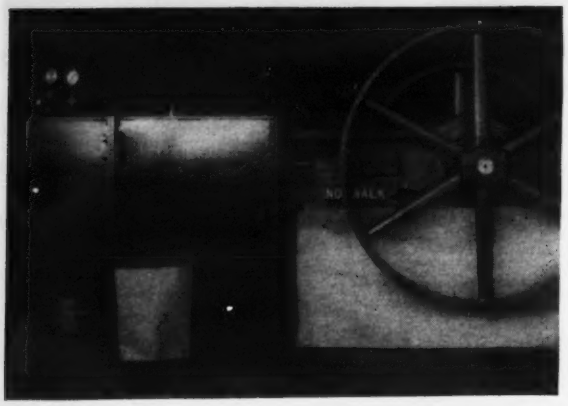


This Norwalk compressor, installed in 1908 in an acetylene manufacturing plant in the midwest, is still in operation.



Factory view of current 3-stage acetylene compressor, as manufactured by Norwalk Company.

Every Norwalk compressor is test-run at the factory, then taken down for complete inspection before re-assembly and shipment.

Norwalk makes compressors from single stage to six stage, from 125 to 25,000 psi pressure, for gases listed below:

ACETYLENE
AIR
ARGON
CERTAIN HYDRO CARBONS
CO AND CO_2
ETHANE
ETHYLENE
HCL
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HYDROGEN
NITROGEN
NITROUS OXIDE
OXYGEN

For full detail, write for Catalog 44

NORWALK COMPANY, INC.

SOUTH NORWALK, CONNECTICUT

Established 1864

Check 1535 opposite last page

ation plant at Houston. The Fluor Corporation, Ltd.'s Mid-Continent Division did the engineering and construction.

Part of plant's capacity will be used to produce alkylate for Plymouth Oil Company from feed supplied by Plymouth. Petro-Tex will make alkylate from butylenes supplied by its butane dehydrogenation plant.

Pittsburgh Coke & Chemical Company's Activated Carbon Division is building a major adition to its activated carbon plant at Pittsburgh, Pa. Upon completion of the addition later this year, the parent company will have more than doubled its activated carbon capacity since 1957.

Foreign Plants

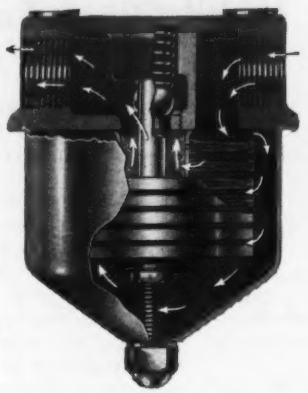
Aziende Colori Nazionali Affini (ACNA), Milan, Italy, has awarded a contract to Badger Manufacturing Company for design and engineering of a 10,000-ton/year phthalic anhydride plant. Construction is scheduled to be completed late this year. ACNA is a subsidiary of the Montecatini group.

Montecatini's new $95-million petrochemical plant is under construction at Brindisi, Italy. It has a planned capacity of 700,000 metric tons of chemicals a year. Products will include polyethylene and isotactic polypropylene, and polymers for synthetic fibers, aldehydes, alcohols, and organic solvents.

Du Pont de Nemours International, S. A., with headquarters in Geneva, Switzerland, has been formed by E. I. du Pont de Nemours & Company, Inc. The new company is a sales organization which will help plan and implement European sales programs for products to be manufactured by Du Pont subsidiaries in Europe, and for many products made in the United States by the parent company.

Dow Chemie Aktiengesellschaft has been formed in Basel, Swtizerland, as a wholly owned subsidiary of The Dow Chemical Company. It will finance Dow's interests overseas.

CLEANABLE MICRONIC LIQUID FILTER



• For the first time, the cleanability and long life of an all metal filter has been combined with extremely small particle removal. The Air-Maze liquid filter is available in many degrees of filtration, down to 98% removal of 10 microns and larger. Constructed of specially processed wire mesh, filtering media is arranged in form of multiple discs which afford over six times more effective area than the same size cylinders. Built-in relief valve optional. Sizes from 1.7 to 720 gpm. Write for bulletin LFC-556. **AIR-MAZE CORPORATION,** Department CP-5, Cleveland 28, Ohio.

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FOR PROCESS & POWER INSTRUMENTATION

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Complete, broad range line makes gauge application-specification easy with assured results backed by 50 years of gauge manufacturing experience.

Ranges from 15 p.s.i., or 30" of vacuum, to 20,000 p.s.i.

Bourdon tubes of bronze, drawn or bored s/s, and other alloys

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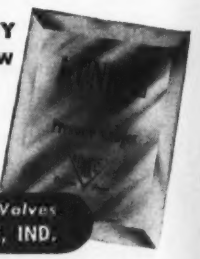

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Spotlight On People

EDWIN C. MCDONALD and MAXWELL W. MACKENZIE are elected directors of Celanese Corporation of America. The former is vice president and a director of Metropolitan Life Insurance Company; Mackenzie is president of Canadian Chemical & Cellulose Company, Ltd., Montreal, a Celanese affiliate.

ALBERT W. WILLIAMS is a new member of the board of directors of Allied Chemical Corporation. He is executive vice president and a director of International Business Machines Corporation. G. P. OLDHAM is named vice president in charge of marketing for Allied's Barrett Division.

At Heavy Minerals Co., Chattanooga, Tenn., J. CARLTON WARD JR., president of Vitro Corporation of America, is elected HMC board chairman. Other new board members are WILLIAM H. DENNE JR. and WILLIAM B. HALL. New HMC officers include Hall, elected president; FRANK B. JEWETT JR., executive vice president; RAYMOND T. RUDER, treasurer; Denne, secretary; and WILLIAM W. STEPHEN JR., assistant treasurer.

ROLF V. WALLIN is appointed vice president — engineering, Union Carbide Chemicals Company, division of Union Carbide Corporation. In the same division, ROBERT L. DUNCAN is named director — product marketing; ROBERT C. BOLTZ becomes sales manager in charge of Carbide's sales forces, and PHILIP G. MAGNUSSON is appointed product sales manager for plasticizers, monomers, and higher alcohols. In the Linde Company division, ROBERT W. PRESSING is appointed general manager, new products department, and R. A. JONES becomes sales manager, Molecular Sieves.

Hooker Chemical Corporation announces the following news concerning personnel: CARL I. GOCHENOUR is appointed general manager — product development. DR. THONET C. DAUPHINE, former CHEMICAL PROCESSING magazine editorial advisory board member, is now in Hooker's general development department, spe-

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NEW GAGES NEW IDEAS

IN THE 1959

Dwyer

INSTRUMENT MANUAL

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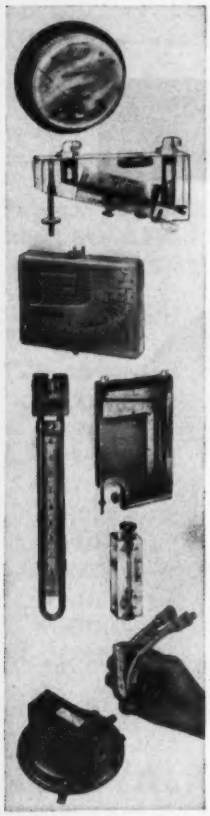

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- Hook Gages . . . a true low pressure calibration standard.
- Air Velocity Meters . . . direct reading of air velocity and static pressure.
- Flowmeters . . flow measurement of gas
- Wind Speed Indicators
- Slack-Tube Manometers . . . roll-up types.
- Flex-Tube Manometers . . . U-tube, well types.
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PEOPLE

cializing in economic development. F. LEONARD BRYANT is appointed general manager of the Phosphorous Division. JOHN S. COEY, a corporate vice president, is now sales manager, Eastern Chemical Division.

At American Cyanamid Company, K. E. YOUNGCHILD is appointed sales manager of the paper chemicals department. JOHN R. BURKETT is named general sales manager of the explosives and mining chemicals department, and DR. N. B. SOMMER is appointed manager of that department.

ROBERT M. HENDERSON is named director of the market research division of Petroleum Chemicals, Inc.

E. GLENN ISENBERG is named general sales manager of Neville Chemical Co.

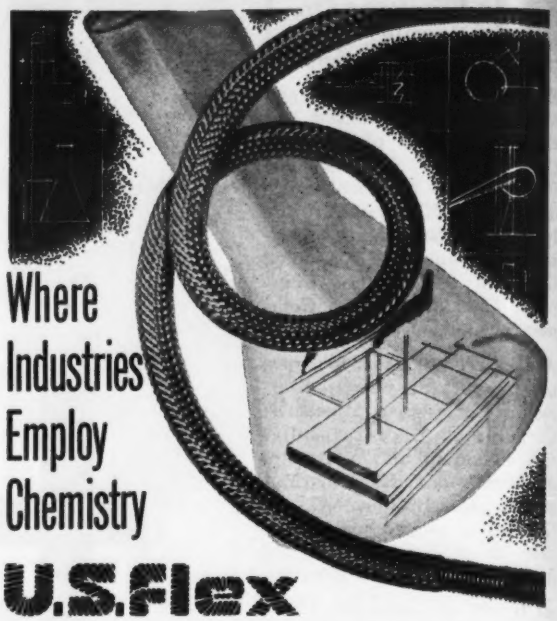
R. J. HULL is promoted to manager of rubber chemicals and plastic sales for Phillips Petroleum Company.

DONALD S. MCKENNEY is appointed sales manager of the Carlisle Division of Carlisle Chemical Works, Inc.

WILLIAM H. HEALEY is appointed new products manager at Air Reduction Chemical Company, a division of Air Reduction Co., Inc.

G. A. HALE is the new manager of paper sales for Minerals & Chemicals Corporation of America.

JOHN R. CARLSON is appointed general manager of American Industrial Chemical Company division of Amerace Corp.



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Watching Washington

Processes to Convert Salt Water to Fresh Seen as Aid to CPI

Need for an additional 250 billion gal of water a day by 1980 over and above what is now available (a large share of which will be required by chemical processors) points up the importance of a recent announcement by the Office of Saline Water that it has approved a salt-to-fresh-water conversion process.

A demonstration plant the OSW has approved is expected to produce fresh water from the sea for less than $1 per thousand gal at a rate of one million gal daily. This is about 50 percent under present conversion costs.

OSW in the past has concentrated most of its efforts on research, and has gradually moved into pilot plant operations.

Congress has authorized construction and operation of no less than five demonstration plants. They will test several of the more advanced saline-water conversion processes.

A total of $10 million has been earmarked for this program. Three plants are to be seawater facilities located on the West Coast, East Coast, and Gulf Coast. The other two are for brackish-water conversion. They are to be located in the northern Great Plains and in the Southwest.

The first process chosen for plant operation is long-tube vertical multiple-effect distillation. It involves an evaporation technique and sudden drops in pressure to boil off fresh water. The process holds promise of a "remarkable breakthrough" in saline-water conversion.

Survey Team

A special management survey team formed at the request of Interior Secretary Fred Seaton already has made 23 recommendations on organization, procedure, and operations of the OSW.

One result was the appointment by Secretary Seaton of a new director, Dr. Arthur L. Miller. He is a former Republican representative from Nebraska who was author of the pesticide amendment bearing his name.

Dr. Miller views the OSW program as vitally important to the future growth of the U. S. He told CHEMICAL PROCESSING that discussions and negotiations are under way with the Atomic Energy Commission for a nuclear-heat plant in combination with a seawater distillation operation. He views this as an "exciting approach to the problem of saline-water conversion."

The problem of salt-water conversion becomes increasingly important from an individual as well as an industry standpoint as the population mushrooms.

It is estimated that 597 billion gal daily of fresh water will be required in the U. S. in 1980. It has been reported that in 1955, when 221 billion gal were consumed per day, one out of every seven persons was rationed in some manner. This, officials say, points up the need for another source of fresh water.

Taxes A Factor

The Interior Department answers complaints that converted-water rates are not competitive with natural fresh-water rates by pointing to such factors as general and hidden taxes in some communities where water rates do not reflect the actual charge for water.

Moreover, the department adds, conversion costs are computed more comprehensively, using a different financial structure. In any event, it is hoped that conversion

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NEW BUDGET DRYER IS IDEAL FOR:

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- electronic equipment
- small cubicles
- pilot plant operations

This entirely new unit supplies up to 20 cubic feet per minute of air, dried to a dewpoint of −60°F or lower. Operation is completely automatic. Likewise, the unit is as foolproof as possible, operating independently of variations in air pressure. Rugged construction and a long operating cycle assure trouble-free use.

Lectrodryer Budget Dryers are standard units, available from stock, shipped ready for installation. For complete information on this new unit and its low cost, write for Bulletin B6A, Pittsburgh Lectrodryer Division, McGraw-Edison Company, 352 32nd St., Pittsburgh 30, Pa.

Lectrodryer McGRAW EDISON

Check 1542 opposite last page

costs will continue to decrease as new processes are found and older processes are improved.

While complying with legal requirements in building demonstration plants, the OSW is continuing its research program. Completion of an experimental deep-basin solar still already has been announced. It is the first of three that will be tested and developed by Battelle Memorial Institute, Columbus, Ohio, at a seashore solar research site near Port Orange, Fla.

Secretary Seaton points out that distillation by solar heat will eliminate the cost of fuel energy otherwise required.

The chemical processing industry gets its due in the other two solar stills nearing completion. Under a cooperative agreement with the Interior Department, Du Pont has supplied basic designs and plastic materials. The larger still uses Mylar as a cover material; the smaller has a cover of experimental film.

'Productive Year'

With these developments under way, spokesmen for Interior Department committees on both sides of Capitol Hill told CHEMICAL PROCESSING this "looks like a most productive year for OSW."

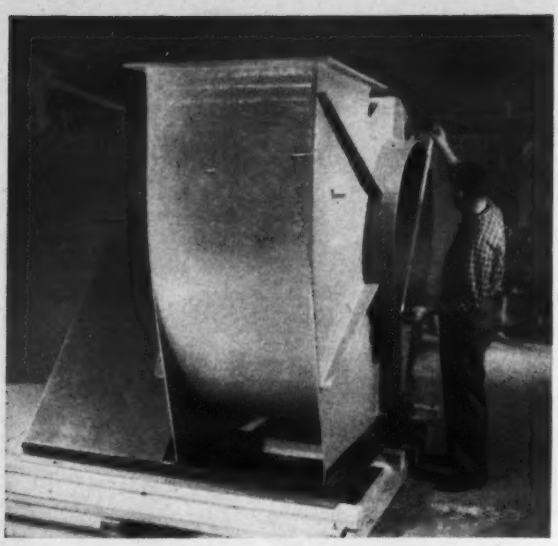
What significance does an accelerated saline-water conversion program have for the chemical processing industry, apart from actual participation in building installations and research? Two important factors are to be considered:

1. As prices of converted water reach cheaper levels, plants can be located in areas that are desirable because of the availability of raw materials, land, and other factors —but where only brackish or seawater is available.

The time may come when a chemical plant will have on its own property a miniature distillation unit for converting saline water to industrial and other uses.

2. Of direct raw material benefit to industry, but still in the brainstorming stage at the OSW, is how to make use

To page 18



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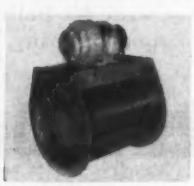

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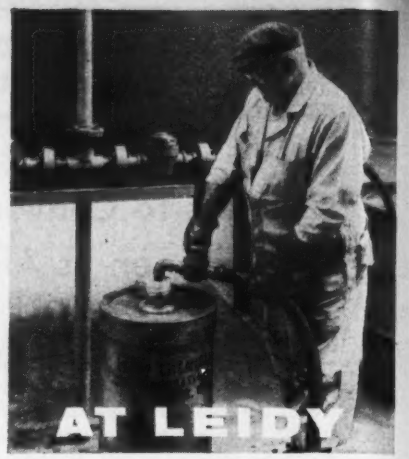

Use of UPVC (unplasticized polyvinyl chloride) piping results in substantial cost savings in handling ferric chloride at Leidy Chemical Corporation, Baltimore. Here, ttp products include elbows, flanges, tees, plug valves.

Here's data on UPVC piping

You, too, can cut costs with UPVC piping . . . and we can help you! Valuable information on properties, applications and installation procedures is given in ttp Catalog 119. Also describes full line of ttp fittings, flanges, valves and specialties. Write for free copy.

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★ Exclusive Helicoid movement has no gears, no teeth. Shock-proof construction protects accuracy through millions of cycles.
★ Bourdon tubes available in four materials—bronze, steel, stainless steel, and K Monel—won't stretch, crack, or leak.
★ Six cases, including new solid-front safety case, meet every mounting requirement.
★ External pointer adjustment can't be jarred out of position.
★ A complete selection of gages and accessories for hydraulic, chemical, and other service.

Write for Catalog G-52.

HELICOID GAGES
Helicoid Gage Division
American Chain & Cable Company, Inc.
929-P Connecticut Avenue • Bridgeport 2, Conn.

ACCO

Check 1545 opposite last page

THAT'S INTERESTING

Electronic doctors

Patients may be literally "wired for sound" in future physical examinations. Check-ups may be performed by an electronic machine that will diagnose a case in 30 seconds, then present findings on a 3x5" punch card. Gulton Industries, Inc., Metuchen, N. J., says the "electronic doctor" probably will be similar to a pilot's wired space suit. New medical electronic system contains instruments that measure breathing rate, heart rate, body temperatures, blood pressure, and skin resistance. Results will be stamped on a punch card, telling doctor what examination's findings are. Instruments were developed because in space travel it will be impossible to send a doctor up in each space ship to find out what is happening to the pilot.

For more information on product at right, specify 1546 see information request blank opposite last page.

ECO ENGINEERING NEWS

the big name in small pumps for the process industries

Pumping Notes

Handling Distilled and Deionized Water

Thousands of Eco ALL-CHEM[x] Pumps are in use in many industries protecting distilled and deionized water from contamination. Their stainless steel and TEFLON construction and lubricant-free operation insure this protection from a chemical standpoint. Further, their non-shearing, smooth, positive thrust of two opposed impellers with overlapping strokes, provides linear, non-foaming flow. This is most important in applications where entrained air bubbles would cause imperfect product results.

Typical applications of this unique, positive-displacement, rotary pump are in handling distilled and deionized water for ampule washing in the pharmaceutical field, washing of germanium diodes in the electronics field, processing of black and white and color film in the photographic field. In national defense, they are also pumping distilled cooling water to the large electron tubes used in the "Dew-line" radar installations across America.

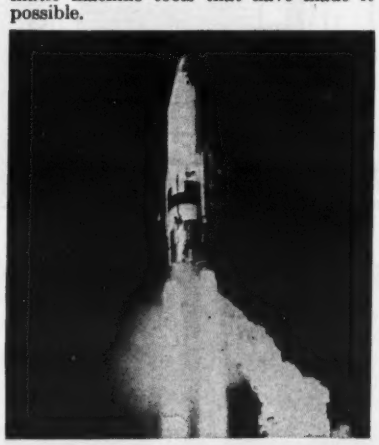
"Missile Grade Accuracy" at Production Prices

March ninth issue of American Machinist carries a two page advertisement of leading machine tool builder, Warner & Swasey, featuring Eco's automatic machining of pump parts from extremely difficult-to-machine nickel alloys and austenitic stainless steels, "with missile grade accuracy" (tolerances as low as .0005"), and at production rates 3 to 10 times faster than previous methods.

"Missile grade accuracy," of course, refers to Eco All-Chem pumping units used in rocket fueling at Cape Canaveral.

But of even greater significance is the W & S statement that "for the first time, the chemical process industry has a wide selection of standard stock pumps *at production prices* to replace former, high cost custom-built units."

Thank you, Warner & Swasey, for telling our story so well, and for your fine automatic machine tools that have made it possible.



NEW ZIRCONIUM PUMP

Handles Boiling HCl

The first commercial-priced production-run zirconium pumps, made from a hitherto rare A.E.C.-developed alloy, are now available for pumping high temperature acids above the range satisfactorily served by Hastelloy C.

Applied initially to the ¾" port, Series 400 Eco GEARCHEM[x] Pump with flows to 10 gpm, this pump is the only rotary, positive displacement pump for HCl service, machined to close tolerances and providing reproducible metering accuracy within ± 1%. All other pumps offered for such service up to this time have been centrifugals or pulse-type proportioning pumps.

High Mechanical Reliability

The decision to explore the possibilities of zirconium as a metal for hot acids was made after careful consideration of all other materials in commercial use.

Ceramics and glass were ruled out because they were subject to thermal and mechanical shock, contributing to unreliability and short life.

Rubber was considered but its temperature limitations caused progressive hardening and chemical deterioration above 140° F.

Fluorocarbon linings showed embrittlement under flexing and proved unsatisfactory for the purpose.

And, of course, the Hastelloys* were considered. Hastelloy C, while machinable, was not sufficiently resistant to hydrochloric above 120° F, and the other Hastelloys were either impossible or too difficult to machine on the high speed, automatic, precision machine tools used by Eco in mass production of their pumps.

The new commercial zirconium alloy containing 2.5 hafnium, though a much more expensive raw material, was experimented with and found to have characteristics favorable to automatic tooling and mass production methods which largely overcame its higher original material cost.

Advantages to Chemical Plant Operators

Zirconium GEARCHEM Pumps exhibit zero effects of corrosive attack when exposed to boiling hydrochloric acid, permitting their use without contamination of the pumped acid with metallic salts, as is experienced through the progressive dissolution of other corrosion affected alloys and non-metallics.

Zirconium is also equally immune to the effects of hot nitric acid at all concentrations, alkali solutions, fused caustics and organic compounds, and is fully resistant to boiling sulphuric acid at concentrations up to 70% and phosphoric acid up to 60%.

Being a durable metal, zirconium is subject to none of the problems of brittle and thermal-shock-sensitive materials.

The result is the most mechanically and chemically reliable pump with greatly extended useful life—making it the most economical pump commercially available for hot acid service. These zirconium GEARCHEM Pumps are regularly furnished with chemically impervious gears of du Pont TEFLON† (another contemporary A.E.C. sponsored development), and with zirconium gears, on special order. Pumps feature a grease-sealed stuffing box to insure leakproof operation against pressure or vacuum, in open or closed loop systems.

ECO Products for Handling Corrosive and Hazardous Processing Fluids

ALL-CHEM Rotary Pumps
MINILAB Rotary Pumps
GEARCHEM Gear Pumps
CENTRI-CHEM Centrifugal Pumps
PUMPMOBILE Portable Pumping Units
CHEMICAL FAUCETS Factory Mutual Approved

Ask for literature on any or all of these ECO Products

xECO Trademarks. †du Pont Trademark. *Union Carbide Trademark.

ECO ENGINEERING COMPANY · 12 New York Avenue · NEWARK 1, N.J.

From page 16

of the concentrated brine from some of the conversion processes. Now waste material, this brine is a potential source of minerals and chemicals for industry.

More Ocean Water

In a report to the President, Secretary Seaton stated:

"Continued reduction of conversion costs will permit us to obtain much of our water from the oceans in the foreseeable future. With 22 of our states bordering on the coast containing 65 percent of our industry and 55 percent of our population, the impact and importance of this program to the future of our country is unmistakably clear."

Chromite ore bill

Criticizing short-sighted Government policy on chromite ore production, senator Wayne Morse (D., Ore.) has introduced a bill, co-sponsored by several other senators, to promote domestic mining and development of this and other strategic minerals.

The bill (S. 1245) is aimed at helping not only chromite ore producers, but also those who produce other strategic minerals, such as columbium-tantalum.

Must Maintain Mines

Pointing to the production standstill on the West Coast, Senator Morse said many small producers, while shutting down mining operations, still had to spend money to maintain mines rather than face possible staggering rehabilitation costs.

The bill will enable miners to keep mines in operating condition and produce at least modest quantities of ore. The bill contains a limit of 5000 long dry tons for any one producer annually under the program, and an overall limitation of 50,000 long dry tons for all producers.

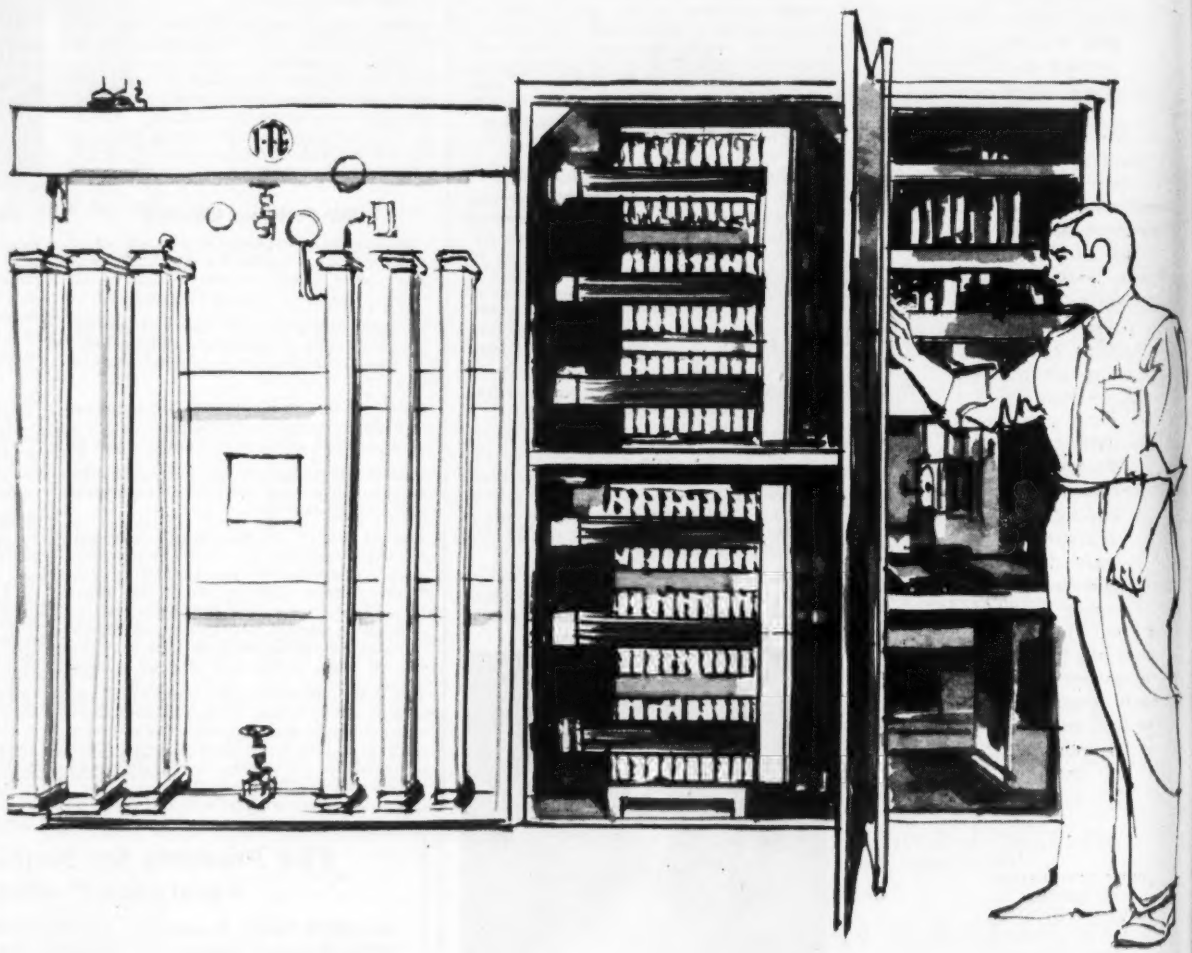
D-C POWER PACKAGE

FOR ELECTROLYTIC PROCESSES

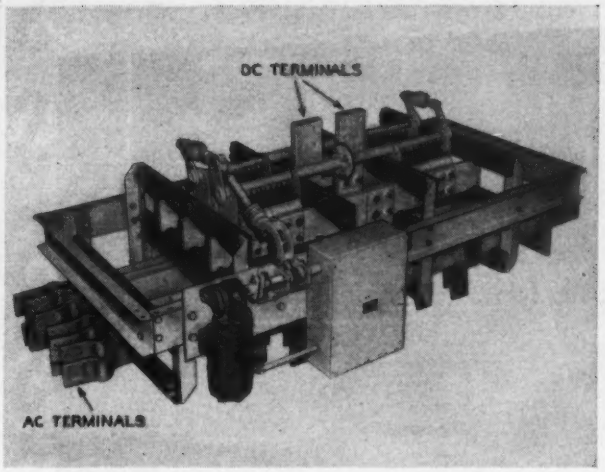
Only the I-T-E UNITRON Semi-Conductor Rectifier lets you select cells at random. Instead of having to code cells for use in various positions, you can use any cell in any position. This is because the unique I-T-E voltage divider and current balancing circuits maintain equal inverse voltage and equal current on all cells. So they have greater assurance of long life.

The UNITRON saves you money in the cooling system too. It uses a closed circuit water cooling system which continuously purifies and deionizes the water. This cooling method eliminates the need for power-eating blowers and space-eating ducts. It saves the cost of special coolants. And it's so effective it significantly prolongs cell life.

The I-T-E UNITRON can be built in any desired d-c voltage and current rating required for your application.



CONDUCTION. I-T-E prefabricated bus comes to you completely engineered down to the last detail . . . including connectors, fittings and bus supports. Number, size and configuration of conductors are carefully specified to insure desired conductivity, high strength, adequate thermal capacity, and low losses. Parts are formed, punched and marked to permit fast, accurate field assembly. All joints are high pressure, with silver-to-silver contact.



CONTROL. Type CR electrolytic cell and bus switches pack enormous capacity into a much smaller space than conventional knife switches. Individual units are furnished in two sizes, 3000 and 6000 amp, and are rated at up to 250 volts. They may be easily paralleled for any desired current capacity. Switch is designed so that contacts may be replaced without dismounting. Long life and dependability proved in service for many years.

PROTECTION. Type FB anode circuit breakers from I-T-E limit arcback current to 60,000 amp or less on large mercury arc rectifier systems. Novel arrangement of 6-pole breaker permits removal of single pole without interrupting service. You can replace a breaker in 3 minutes. Each pole is complete in itself. FB breakers can be equipped with reclosing controls for completely automatic protection of unattended stations.

CI-3

I-T-E Circuit Breaker Company
1900 Hamilton St., Philadelphia 30, Pa.

- ☐ UNITRON rectifier
- ☐ Type FB circuit breakers
- ☐ Prefabricated bus
- ☐ Type CR switches
- ☐ Primary unit substations
- ☐ K-LINE LV switchgear (600 v)
- ☐ Other.....

Name.....Title.....

Company.....

Street.....

City.....Zone.....State.....

SEND COUPON

Get complete, up-to-date information on I-T-E equipment

I-T-E CIRCUIT BREAKER COMPANY

Check 1547 opposite last page

nuclear notes

Significant news about atomic energy

Air monitor gives warning, keeps permanent record

Recently developed air monitor not only warms personnel of excessive airborne particulate radioactivity, but also provides permanent legal record of the integrated radioactive dose.

Instrument is said to be only monitor on market that detects alpha, beta, and gamma activity simultaneously with a single detector. Unit will operate for approximately five days unattended. Maximum counting rate is 50,000 cpm.

(Model AM-2A air monitor is product of Nuclear Measurements Corp., 2460 N. Arlington Ave., Indianapolis 18, Indiana.)

Check 1548 opposite last page.

Natural salt formations to hold nuclear waste

A small-scale field study of the possibility of disposing radioactive wastes in natural salt formations will soon be undertaken. Simulated wastes, having same chemical compositions as radioactive wastes which result from reprocessing reactor fuel elements, will be used in the study.

Oak Ridge National Laboratory will conduct the experiment. Carey Salt Company of Hutchinson, Kansas, will prepare site, excavate test holes, and provide supporting services. Operations will start this summer and are expected to be completed by January 1960.

Thermonuclear powered welding machine

Model of a welding machine that theoretically draws its electrical operating power from a thermonuclear source is scheduled to be exhibited by A. O. Smith Corporation at the American Welding Society Convention, April 7-9 in Chicago.

TAPEnology develops all-purpose pipe sealant that rolls on dry!

Now, with new "SCOTCH" Brand Pipe Sealant Tape No. 547, you can stop fitting leaks quickly . . . easily . . . permanently! And, unlike conventional "pipe dopes", it rolls on dry; a single wrapping around the threads *does the job on any line.*

This new all-purpose sealant for your piping systems is chemically inert; withstands processing temperatures from the liquid oxygen range on up through super-heated steam; is not affected by traces of oil or other lubricants in the steam lines.

Tape No. 547 is easy to use, too! Handy roll size fits any pocket; can be applied anywhere; conforms tightly; any excess strips off easily to leave a neat, clean joint. What's more, it never dries out . . . permanently lubricated joints never stick; open with ease during line re-positioning.

Ask your nearest "SCOTCH" Brand Tape distributor for complete information, or write: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. OL-59.

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"SCOTCH" BRAND TAPES
TAPE-O-RAMA Contest
135 prizes . . . write for details
CLOSES JUNE 30, 1959

When tape costs so little, why take less than "SCOTCH" Brand?

"SCOTCH" is a registered trademark for the pressure-sensitive adhesive tapes of 3M Co., St. Paul 6, Minn. Export: 99 Park Ave., New York 16. Canada: London, Ontario.

MINNESOTA MINING AND MANUFACTURING COMPANY
. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

Check 1549 opposite last page

NUCLEAR NOTES

Nuclear-waste disposal via ship's propeller

Experiments conducted on Lake Michigan have revealed that a ship's churning propeller is a most effective force in dispersing nuclear wastes in water. Study was carried out by scientists of Armour Research Foundation of Illinois Institute of Technology.

Testing indicated that wake of ship's hull and natural sea currents were of only secondary importance in dispersing nuclear waste. A small boat and non-toxic, non-radioactive colored dye were used to approximate conditions of a larger nuclear-powered vessel.

Uranium dioxide plant for Spencer

Planned construction of UO_2 plant has been announced by Spencer Chemical Company. Plant will be erected at company's Jayhawk Works near Pittsburg, Kansas, and will be able to process approximately 50 tons UO_2 per yr.

U. S. A-sub plant to go to Britain

Complete Skipjack-type submarine nuclear propulsion plant, spare parts, design, and related restricted data is being sent to the United Kingdom. It will be installed in the British submarine, Dreadnought. The transfer is in accordance with mutual defense agreement.

Krypton-85 output boosted by AEC

In response to industrial requests, AEC has boosted the output of Krypton-85 for civilian use to 100,000 curies/yr. Increased availability is expected to expand present civilian applications and stimulate development of new uses. Price for radioisotope is $50 for each of first two curies and $15.00 for each additional curie. Half-life is 10.27 yrs.

Medium-size Companies Offer Lure For Investors

WILLIAM R. WHITE, Market Analyst
Hornblower & Weeks

The vigorous recovery in industrial activity this spring has given impetus to an unexpected resurgence in chemical sales. Although accumulation of raw-material inventories has been accelerated in some areas in anticipation of work stoppages in major industries upon expiration of wage contracts, actual consumption has reached a higher volume than had seemed likely a few months ago.

Consequently, earnings projections for representative producers have brightened considerably. If recent trends persist through the current quarter, profits for the first six months should register exceptional gains over the corresponding 1958 period.

This hopeful prospect has aroused investment interest in seasoned equities in the petrochemical and allied groups.

So-called "blue chip" issues — such as Dow Chemical, discussed in this column in January; and Du Pont, discussed in November — have scored wide gains.

Many medium-size companies, evidently destined to experience substantial improvement in sales and earnings this year, deserve consideration.

Diamond Alkali

Among concerns which have recovered from effects of last year's recession one may mention Diamond Alkali Company, for which sales this year are being projected at an all-time high of about $125 million against $114.2 million in 1958 and $122.6 million in 1957.

Shipments in the first half may approximate $60 million, while net profit may be in the range of $1.25 to $1.40 a share.

Results for the full year could show encouraging progress over the 1958 showing of $2.32 a share, even though operations are likely to be hampered by a major modernization program at the Painesville, Ohio, plant.

Economies anticipated through installation of new equipment and through elimination of unprofitable activities are expected to pave the way for a rebound in earning power to above the $3.83 a share of 1956.

Wider coverage for the $1.80 annual dividend envisaged for this year has bolstered investment interest in the shares.

Harshaw Chemical

Harshaw Chemical Company fared reasonably well in 1958, despite generally unsatisfactory profit margins, because of wide product diversification. Its progress in research has been outstanding in the last decade.

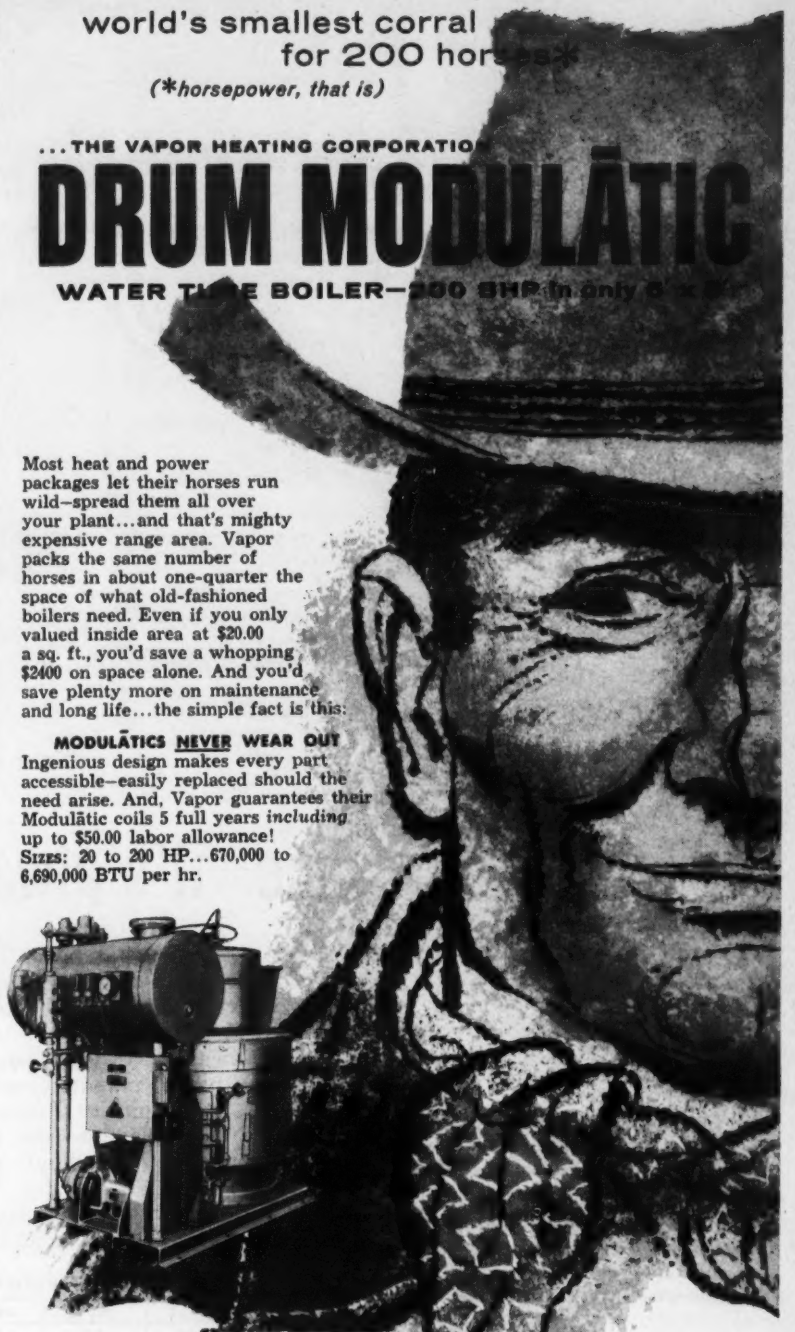
Reflecting the strong upturn in industrial activity, Harshaw sales for the fiscal year ending next September are expected to make a favorable comparison with the 1958 showing of $59.9 million, which represented a moderate setback from the 1957 peak of $66 million.

Net profit may come within striking distance of the average of slightly better than $2.50 a share recorded for 1955 through 1957.

Although return on a $1 annual dividend paid for the last two years is not especially liberal, it appears reasonable under present conditions.

Pennsalt Chemicals

With the benefit of greater promotional activity and benefits of operating economies, Pennsalt Chemicals Corporation registered a better-than-average showing for 1958, and shows promise of continuing


world's smallest corral
for 200 hor
(*horsepower, that is)
...THE VAPOR HEATING CORPORATIO
DRUM MODULĀTIC
WATER T E BOILER—
Most heat and power packages let their horses run wild—spread them all over your plant...and that's mighty expensive range area. Vapor packs the same number of horses in about one-quarter the space of what old-fashioned boilers need. Even if you only valued inside area at $20.00 a sq. ft., you'd save a whopping $2400 on space alone. And you'd save plenty more on maintenance and long life...the simple fact is this:
MODULĀTICS NEVER WEAR OUT
Ingenious design makes every part accessible—easily replaced should the need arise. And, Vapor guarantees their Modulātic coils 5 full years including up to $50.00 labor allowance!
SIZES: 20 to 200 HP...670,000 to 6,690,000 BTU per hr.
DEFERRED PAYMENT PLANS AVAILABLE IF YOUR CASH HAS OTHER WORK TO DO

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Send me free literature: ☐ Drum Modulātic Bulletin 475; ☐ Modulātics for pressures to 1000 psi, Bulletin 586; ☐ Extended Payment Terms Bulletin 486; ☐ Hydrolātic Hot Water Boiler Bulletin 490.

Name_____

Address_____

City, Zone, State_____

Check 1550 opposite last page

the improvement this year.

Benefits of enlarged productive capacity should become more clearly evident this year. The bulk of output is based on salt, and about half of requirements is obtained from properties underlying the Michigan plant. Reserves are estimated to be adequate for another century of operation.

Net profit may approximate the $3.55 a share reported for 1951, while next year's results are being projected at a new peak in excess of the 1950 record of $4.02 a share.

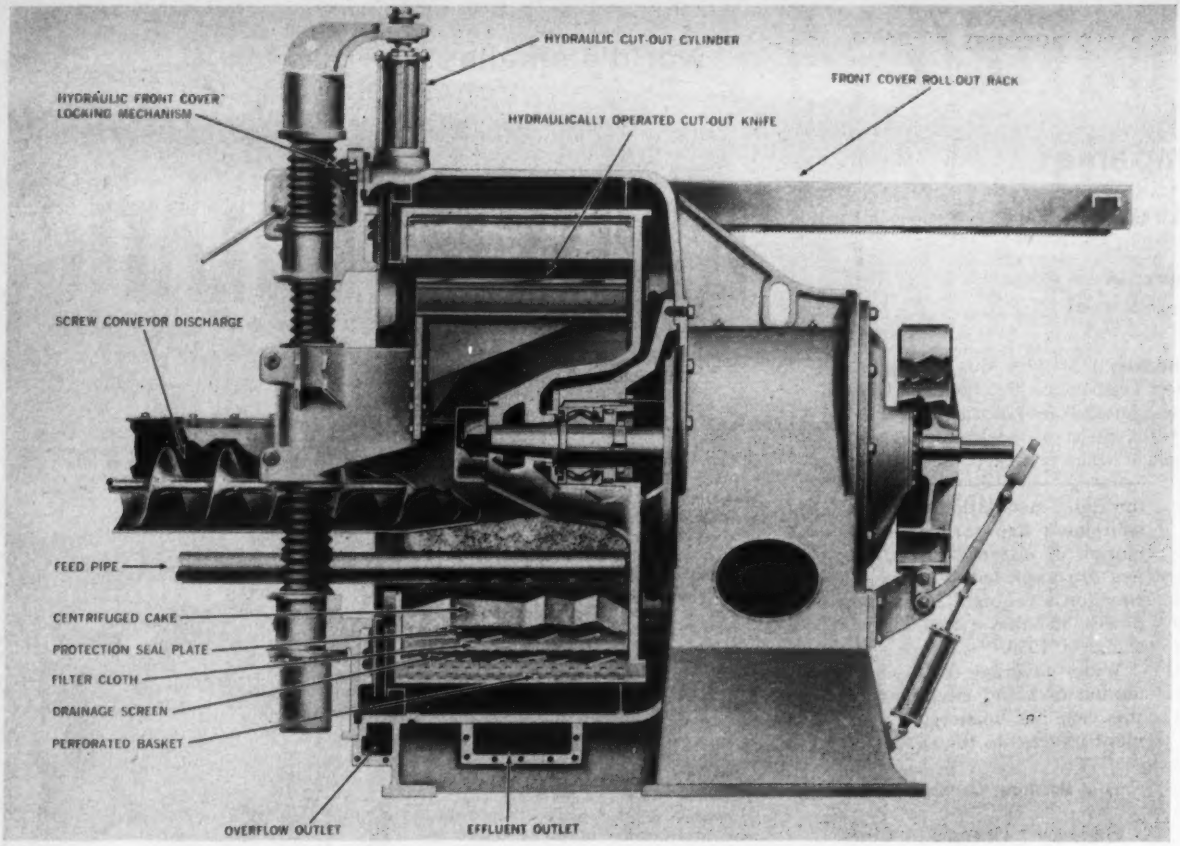
Dividends at the $1.85 annual rate are well protected.

(For further information on stocks of companies in the chemical processing and allied fields, write Hornblower & Weeks, 40 Wall St., New York 5, New York.)

Check 1552 opposite last page.

Chemical nomenclature and recommended abbreviations are contained in eight-page booklet. Nearly 300 abbreviations for use in reagent and fine chemicals fields are listed. Abbreviations are intended primarily for mechanical data processing systems, where text space is limited, and not for more technical or scientific applications. Nomenclature is given first, followed by abbreviations, in one section; order is reversed in other section. Manual Sheet CA-1 may be obtained by remitting 20c to Manufacturing Chemists' Association, 1625 Eye St. N.W., Washington 6, D. C.

"Well, if this is your idea of going 'on stream' . . . I'm all for it."



For Top Performance—it's always REINEVELD

For any given bowl diameter, the Reineveld Centrifugal produces the greatest force field. Its lower product moisture, higher capacity and more economical operation are functions of these higher G's.

The cut-away view clearly illustrates the superior design, high-lighted by the patented centrally located main bearing. Note also that cleaning and maintenance of the Reineveld is reduced to a simple, low-cost operation by quick-opening features such as the roll-out of the hydraulically locked front cover.

Precise workmanship and rugged design make it the outstanding new Centrifugal in its field.

DESIGN DATA OF REINEVELD CENTRIFUGALS

Bowl Diameter	28" S	36"	51"	68"	80"
Bowl Content (cu. ft.)	1.2	4.9	13.2	28.1	43.3
Bowl Content (gallons)	9.0	36.5	99.0	211.0	325.0
Screen Area (sq. ft.)	6.2	13.5	27.4	46.5	65.0
Design RPM	2000	1500	1085	850	750
Equivalent Force (G's)	1560	1140	850	700	625

H&P CYCLONES

When classifying or thickening slurries is required, the most economical tool for a plant desiring continuous flow is the H & P Cyclone. Heyl & Patterson carries a complete line of various sizes and capacities of Cyclones, including the new 1⅛"-14° Cyclone.

Consult Heyl & Patterson's listing in CEC or write for Bulletin 356 for Reinevelds, or Bulletin 1157 for H & P Cyclones.

Heyl & Patterson INC.

55 FORT PITT BLVD., PITTSBURGH 22, PA., COurt 1-0750

Check 1551 opposite last page

THAT'S INTERESTING

Any dents?

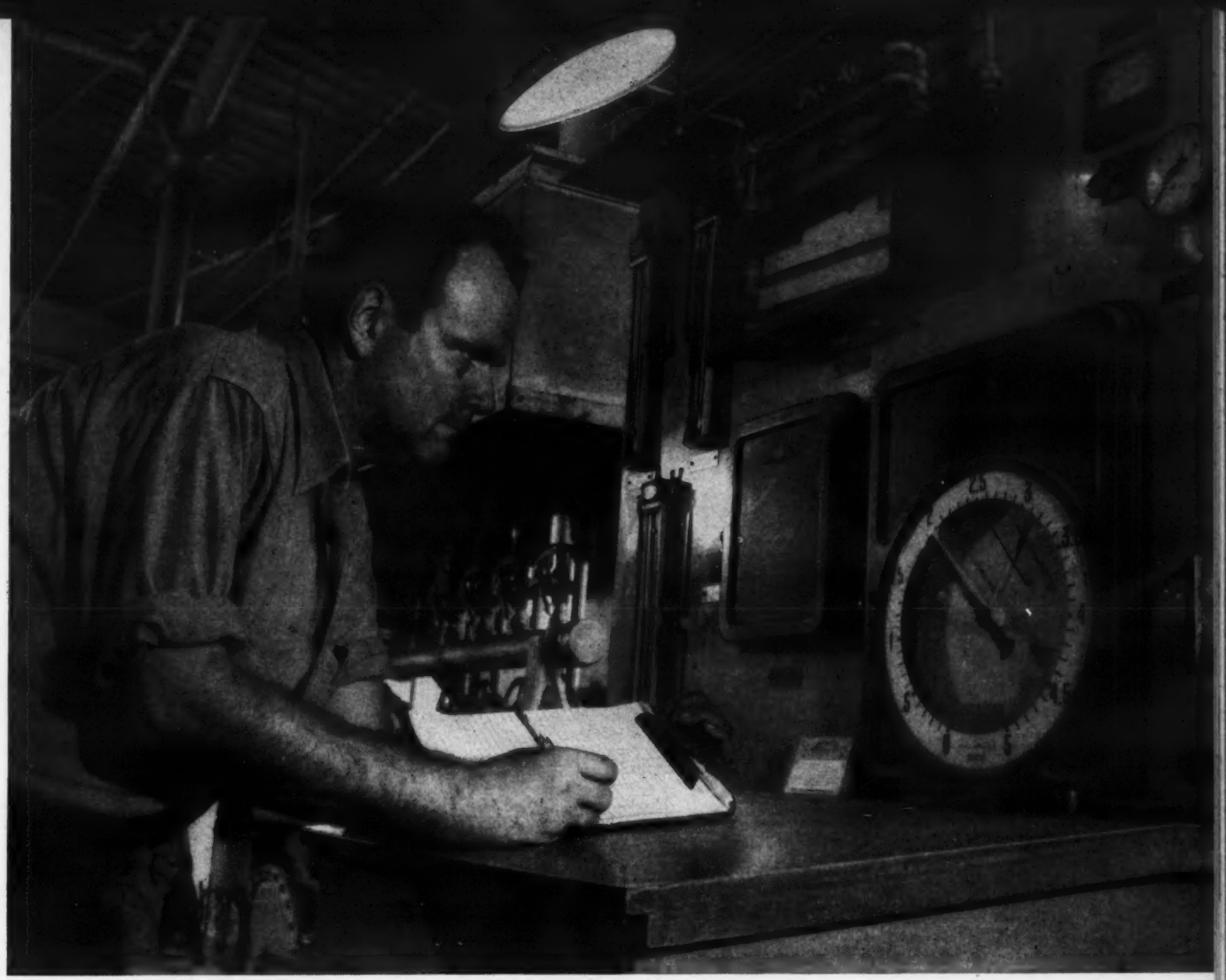
Now we have statistics to prove what most men have known for a long time—that women are no good at parking cars. Analysis of 12,000 New York State road tests show, *Shell News* reports, that women applicants for driver licenses rate just as high as men—except for parking.

It floats

Floating stainless steel has been developed by Crosley Division, Avco Manufacturing Corp. Development results from discovery that porous stainless, made for missiles and planes, is buoyant in water.

Going up!

It took more than 200,000 years for the world population to reach 25,000 million. Yet, it is indicated in just 30 years more an additional 20,000 million will be added—concrete proof of the oft-repeated phrase, "population explosion."



For tested generator performance . . .

Come to Kemp

At Gulf Oil's Port Arthur, Texas refinery, purging inerts are supplied by Kemp Generator and Kemp Dryer working as a team. The units produce 30,000 SCFH for a bountiful and easily controlled supply at low cost.

Tested . . . and proved! Factory tested with rigid component checks, field tested by Kemp engineers at installation, and time tested by years of actual use. Proved that Kemp Inert Gas Generators are built to last, built to produce, built to be accurate.

At the heart of every Kemp Generator is the Kemp Industrial Carburetor, uncomplicated in concept, yet outstanding in performance. It provides sensitive and accurate control of inert analysis. A quick setting of the calibrated dial insures delivery of an unvarying mixture, regardless of line demands.

And Kemp design—rugged, simple, and sturdy—means that maintenance and attendance requirements are kept to a bare minimum. Kemp Inert Gas Generators stand up under the toughest conditions, yet produce with complete dependability.

To get detailed information and ideas, give your Kemp Representative a call. Or write us direct for Bulletin I-10. THE C. M. KEMP MFG. Co., 405 East Oliver St., Baltimore 2, Maryland.

Convection Dryers

Atmos Generators

KEMP OF BALTIMORE

Nitrogen Generators

Oriad Dryers

Check 1553 opposite last page

In this revolving drum, tablets are coated with syrups, powders and waxes. Because the drum is Stainless Steel, it takes only a few seconds to clean it with steam jets.

Stainless Steel equipment protects 100% product purity

at Eli Lilly and Company, Indianapolis, Indiana

"Science has created hundreds of lifesaving and pain-relieving formulas," says an official of Eli Lilly and Company. "But unless these formulas are produced in medicines that are 100% free of every possible contamination, they could do more harm than good. We make millions of tablets every month, for instance, and we must be positive that the ingredients are pure for every single one. That's why we use nothing but Stainless Steel for so much of our equipment.

"Stainless guarantees product purity. It resists corrosion. It's durable and hard, won't chip or crack. It has a smooth, dense surface that is easy to keep clean—and it is not harmed by the cleaning agents we must use. True, we paid more to install Stainless Steel, but it will save money in the long run because we don't have to worry about replacements."

Eliminate product contamination in your plant. Start by examining your equipment to see if it's a threat to cleanliness. Replace it with Stainless Steel. And specify USS Stainless Steel for service-tested quality.

USS Stainless Steel is available through your U.S. Steel representative or your local Steel Service Center.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

USS United States Steel

CHEMICAL PROCESSING

The March issue of CHEMICAL PROCESSING carried an article by Fred A. Hartley Jr. entitled, "We Should Fight for the Right to Work." In the next issue, April, Mr. Hartley's position was supported by Senator Barry Goldwater of Arizona — and opposed in a comment by John McCollum of the University of Chicago. Now, in this current May issue, we have the comments of four more leaders on the controversial issue of right to work

PRO & CON ON RIGHT TO WORK

WILLIAM T. HARRISON
President
National Right to Work Committee

I am pleased to see CHEMICAL PROCESSING devoting its pages to crystallizing its readers' thinking on the much-maligned issue of Right to Work. I congratulate you also on your choice of Mr. Hartley to place the issue in its proper perspective for your readers. I have had the privilege of being associated with him for many years and consider him an eminently capable spokesman in this battle to preserve the rapidly disappearing rights of America's working man.

Mr. Hartley, in his article, has done a masterful job of destroying every argument of the labor potentates, disposing neatly of the same tired phrases and faulty logic which are dutifully mouthed by Big Labor propagandists whenever Right to Work is mentioned.

I have been fighting the self-anointed "protectors" of the working man since 1951 when I was expelled from my own union for having the audacity to disagree with the Grand Sachems. In all those years, they have failed consistently to develop any facts to support their case, but they continue nevertheless to sing the same old song.

They can sing it until cows come home and it won't alter the fact that labor's overlords, through manipulation of funds and power purchased with compulsory union dues, are in a frightening position of special privilege today. I cite the McClellan hearings as a continuing example of the abuses being perpetrated by labor bosses, goons, and racketeers.

Their tyrannical use of ill-gotten power will be shut off only when all of those Americans who believe in preserving the individual freedom of the working man speak out as forcefully and fearlessly as does Mr. Hartley. ■

HARRISON A. WILLIAMS Jr.
Senator
State of New Jersey

I vigorously oppose right-to-work laws because they deny a basic tenet of modern society. Under the misnamed right-to-work laws, a majority of employees cannot decide whether theirs shall be an open or union shop.

The power to make this decision, in my judgement, is an opportunity — I should say a right — which cannot be taken by any state law. Any law which denies this right, I oppose.

Right-to-work laws are, in my opinion, backward steps which only a relatively few state legislatures have taken. I am happy to see that already there appears to be a strong counter-movement in those few states. ■

PAT McNAMARA
Senator
State of Michigan

The so-called "right-to-work" laws are a hoax on the working people of this country. In actuality, they are only a poorly disguised union busting technique, designed to rob employees of their right to win union security at the bargaining table.

These laws, of course, give no one any right to a job. If they did, would we have nearly five million unemployed? Instead, these destructive measures are pushed by those who seek to cripple the labor movement or to attract industry to low-wage states where the workers' rights to organize are thus seriously jeopardized.

Fortunately, the people are

To page 111

This IBM 650 computer helps take the "hunch" out of product distribution scheduling patterns at The Dow Chemical Company, Midland, Mich. Shown at control panel is W. E. Wright of Dow's Computing Machines Services staff

Use of scientific programming has enabled The Dow Chemical Company to determine optimum distribution product patterns. Electronic computer and operations research techniques show . . .

How to Eliminate 'Hunch' Scheduling

J. I. MORGAN*, Graduate Student
Case Institute of Technology

TO provide the best customer service and protection, as well as economy of operation, The Dow Chemical Company produces and stocks many items at several points.

Because of its multi-supply point operations, Dow is faced with many complex production-distribution scheduling problems. As a result, it has been vitally interested in developing methods to solve them. With the use of electronic computers and the techniques of operations research, Dow has now developed formalized methods for handling these problems so that the total efficiency of the system, production to customers, is maximized.

These methods begin with a basic study of the problem. In it, all factors involved are evaluated and output reports, tables, graphs, and maps are printed. Factors involved in a study are number of supply points, availability at each supply point, customer destinations to be supplied, demands at each destination, and cost of supplying each destination from each supply point.

**Formerly on Production Coordination staff of The Dow Chemical Company.*

This output material is then used for the continuous evaluation of the problem which forms the basis for normal production and shipping scheduling. Basic part of the study is renewed at some periodic interval such as once a year or whenever there is a significant change in basic factors.

Benefits of Output Data

Output data aids in answering questions such as which producing point should supply each intermediate supply point and which supply point should supply each destination. It aids also in determining when new supply points should be added and in setting availabilities at supply points when these values are not otherwise pre-set. It provides cost information for evaluating alternative distribution patterns.

A study is usually made for one product. However, if several products are related back to a basic product, it may be made on the group of products. In the latter case, it is necessary to relate all quantities and costs to the basic product or some other common base.

The procedures which Dow has developed rely heavily on the use of an IBM 650 computer and its periphery equipment. This is necessary because of the magnitude of the problem and the complexity of the mathematical operations. Smaller, less complex studies can be done without the computer, but it would be impossible to do most of the larger studies without it.

Mathematical operations involved in solving these problems are of two types—linear programming techniques and ranking techniques. Production-distribution problems fall into a category of linear programming problems called the transportation problem.

Transportation Technique

The transportation technique is a mathematically-proven method which yields the optimum solution (minimum cost) for any pre-set conditions. It can be used for any number of supply points

To page 113

PRODUCT Q

Ranking Table
Point A vs. Point B

Destination	Unit Advantage A over B	Demand	Accumulated Demand
1	$10.00	5	5
2	9.73	11	16
3	9.34	1	17
4	8.12	3	20
5	7.60	2	22
6	5.43	7	29
7	5.39	5	34
8	2.10	15	49
9	−0.15	4	53
10	−1.38	1	54
11	−5.78	8	62
12	−6.13	12	74

Management and employee satisfaction and a high caliber of performance are achieved at S. C. Johnson & Son, Inc., as a result of an . . .

Intelligent Approach to Personnel Testing

Dr. Pat Driscoll (left), head of Johnson's testing program, interprets for chief experimental engineer, Ed Pavilonis, test results of a prospective employee

Tests are also used in company's management development program

PERSONNEL TESTING — especially from the personality standpoint, is used and abused in many instances. However, some companies have taken an intelligent approach to screening procedures when choosing their personnel. One such company is S. C. Johnson & Son, Inc. of Racine, Wisconsin.

Johnson began testing personnel around 1942. Originally, testing was conducted by an outside agency.

In 1949, Dr. Harland N. Cisney, a psychologist experienced in personnel testing, was hired to set up a company program. He was named personnel director in 1950 and shortly thereafter Johnson began its own testing program. Dr. Pat Driscoll, who joined the company in 1951 as an assistant to Dr. Cisney, now administers the testing program.

At first, tests were given only to selected applicants. Gradually, the program was expanded to include prospective sales personnel, and finally to all applicants.

Testing Procedures

Johnson uses standardized tests that have become familiar and accepted by company management, and have proven suitable to the company's needs. Various test batteries have been set up to cover specific job areas. Each test battery is divided into three classifications: ability, interest, and personality. The ability tests are of the general intelligence type; the interest tests might be either the Strong or Kuder; and the personality segment consists of paper and pencil tests.

Before any tests are given, the applicant has an interview with the head of the department in which he might be employed. He is then given the appropriate test battery that may require from 3 to 4 hours to complete. Usually, the tests are scored and profiled as soon as they are completed by the applicant. The results are then made immediately available to the department head. The applicant may have the test interpretations, whether or not he is hired, if requested.

Test Evaluation

In evaluating the tests, Johnson places greatest emphasis on ability tests. Wisely, the company views the results of the personality series with reservations. Viewed in the proper perspective by a qualified observer, this type of test can be useful to the prospective employer and not necessarily detrimental to the prospective employee. Johnson's is cautious in interpreting the results of the personality tests. When an evaluation of a test is completed, a verbal interpretation is relayed to the department head by Dr. Driscoll.

When sales personnel are screened in the field standard self-administered tests are given to the applicants. Test booklets are sent to Racine, scored, and results are telegraphed to the supervisors. In its tests for salesmen, Johnson uses its own personnel as the norm for evaluation.

Johnson also uses the testing procedure as an aid in upgrading its employees and in helping employees in developing their future goals.

Test results are not used by Johnson as the sole determinant in hiring personnel. Rather, they are looked upon as an important aid in judging an applicant's suitability. Personal interviews, past performances, recommendations, educational background, and experience are all factors taken into consideration before a decision is made to hire an applicant. Although department heads do not hire a man without seeing test results, Johnson is careful not to place undue emphasis on them.

Management Development Program

Another way in which tests are employed is in the Johnson Management Development Program, inauguratd in 1955. In this program several means are used to get an evaluation of a man. A detailed record of background and past per-

To bottom of page 115

Improving product quality while cutting processing time from hours down to minutes, Corn Products safely and successfully performs centrifugal and . . .

Flash Drying of Corn Starch

TED F. MEINHOLD, Associate Editor
with **THOMAS WAGNER,** Process Engineer
Corn Products Company

FLASH DRYING has converted a laborious, time-consuming, batch operation into a streamlined, up-to-date continuous process at the Corn Products Company, Argo, Illinois, plant. Used to dry a 22° Be′ slurry of corn starch from 60 down to 12.0% moisture content, the system has resulted in a number of benefits to the company — including increased production, lower operating costs, and more uniform and improved starch products.

Installed in January 1958, the flash drying equipment has replaced a portion of the kiln-type drying facilities used for many years at the plant. Production for the portion of equipment replaced has consequently been boosted from 250,000 to about 380,000 lb per day.

Eliminating wagon and tunnel loading and unloading operations necessary under the former arrangement has greatly simplified operation. Processing time has been slashed from hours to minutes. Process control is fully automatic — all operations being directed from centrally-located graphic control panel.

Final moisture content is easily held within ½% of desired point, compared to wider variations obtained with kiln drying method. Bulk density remains constant at 39 lb per cu ft. Mesh size of final product is about 125.

Centrifuges Play Big Part

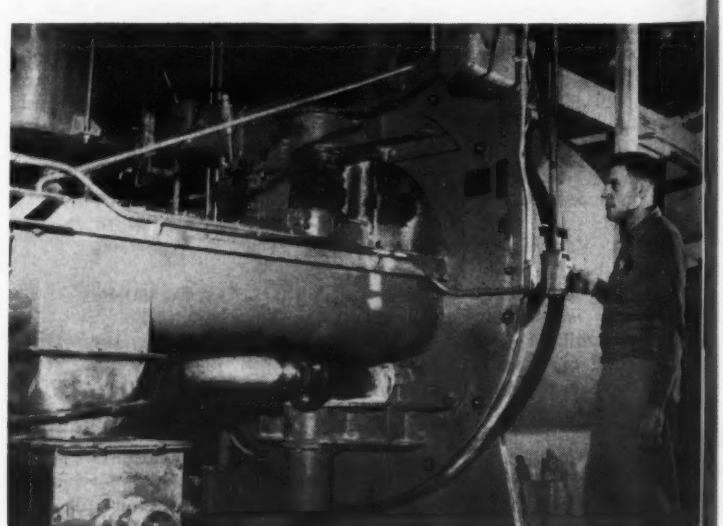
Probably the most important pieces of equipment in the overall system are two big automatic-cycle-controlled, horizontal Reineveld centrifuges that perform the dewatering step in the process. Constructed of stainless steel, each of the units has 68″ diam bowl handling about 222 gal slurry per batch.

A 300-gal capacity feed tank is mounted directly above each machine. Starch slurry, heated to 125°F in starch heater and stocked in 4000-gal agitated supply tank, is fed to each of the feed tanks. Charges are automatically made to the centrifuges by means of pneumatically-operated valves on bottom of feed tanks.

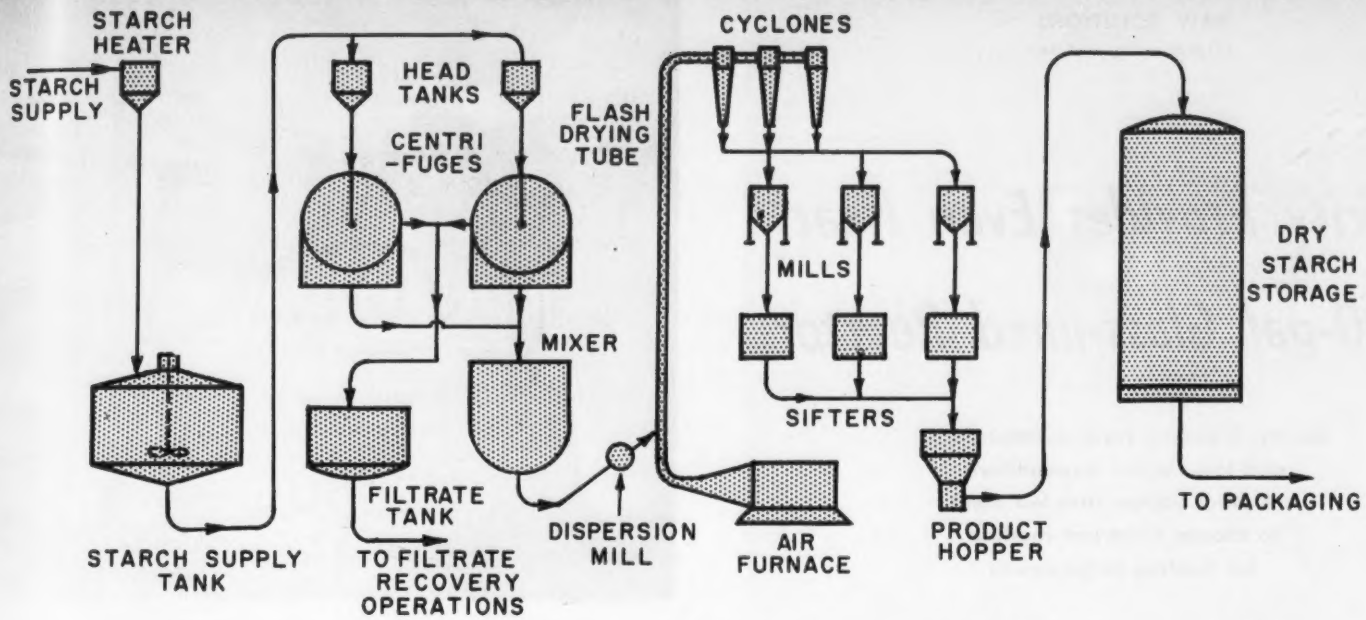
Operating alternately, the centrifuges cut moisture content of the slurry from 60 down to 33-35%. Operating cycle for each machine is approximately eight minutes.

The machines perform at 800 rpm — developing a force of 640 times that of gravity. Units are driven by 75-hp, 1750-rpm, belt-drive, electric motors. Effective filtration area is 49.5 sq ft. Cotton twill cloth (17½ ounce) is used as filtering medium.

All steps in the centrifuge cycle — charge, dewater, and cut-out — can be accomplished at full operative speed. Cake is removed (cut-out) by a hydraulically-operated plow or knife moving upward into the 8″ thick cake. Rate of solids removable is easily controlled by regulating rate of upward travel of the cut-out mechanism.



Big 68" bowl-diam centrifuge cuts moisture content of 22°Be' starch slurry from 60 down to 33%



Simplified flow diagram illustrates centrifugal and flash drying system for processing corn starch at Corn Products Company

Separated cake drops into giant 13,000-lb ribbon-type mixer where moisture content from the two centrifuges are equalized. Filtrate from centrifuges is separated into liquid and solid components. Both are recycled back through process.

Screw conveyor transfers cake from mixer through kicker-type dispersion mill into insulated 40″-diam, stainless steel, flash-drying tube. Unit is about 68′ long and operates at 425-455°F. Heated air from direct-fired, propane- and natural gas-fueled furnace acts as drying medium. Air flow through tube is about 47,000 scfm. Contact time for starch is approximately one second.

Starch, hot air, and moisture leaving tube pass through group of eight 26′-high cyclones. Starch falls to bottom of cyclones, is further processed through mills and sifters, and finally transferred by air conveying system to finished powdered starch storage. Product is then ready for bagging and packaging.

Moisture of final product is controlled by cyclone-air exit temperature — usually held below 180°F.

(Reineveld centrifuges used in drying system are product of Heyl & Patterson, Inc., 55 Fort Pitt Blvd., Pittsburgh 22, Pennsylvania.)

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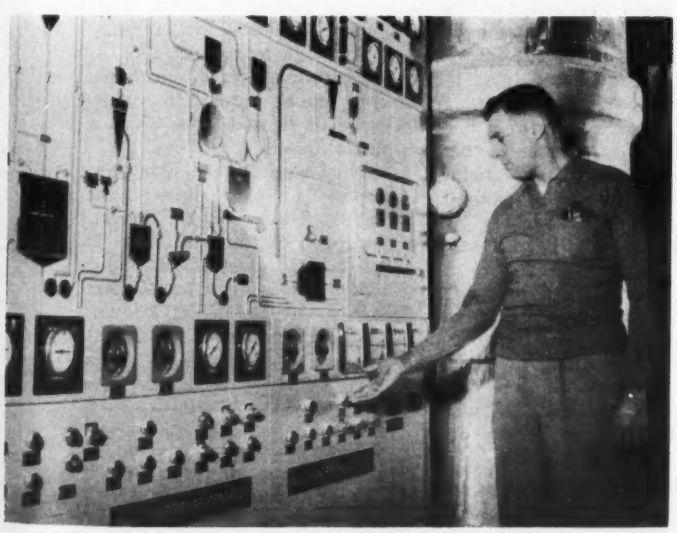
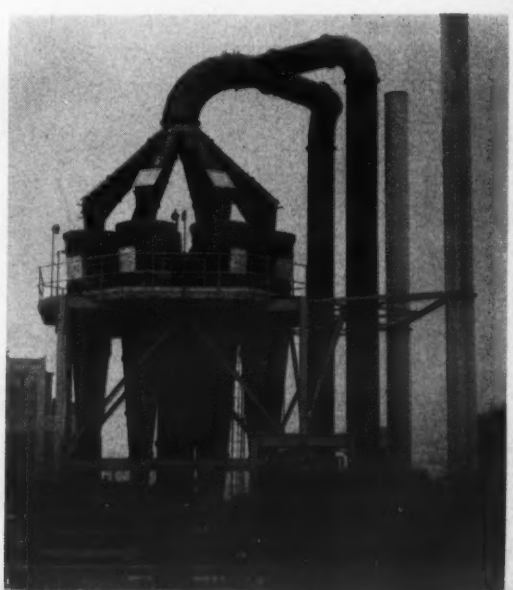


Centrally-located graphic control panel is nerve center of process. Portion of drying tube can be seen in background

Photos by CP Staff

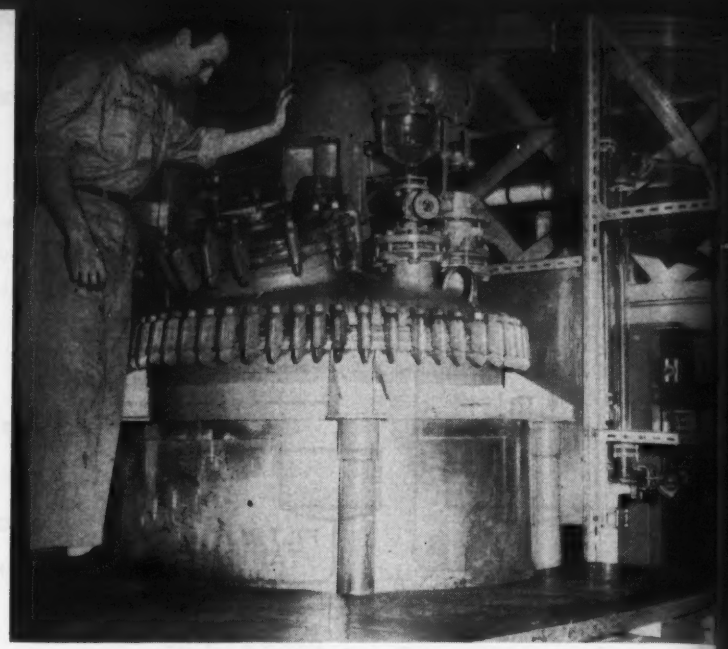


Resembling an octopus, eight 26′-high cyclones located on top of flash dryer building efficiently separate starch and moisture after they leave drying tube

Electricity Provides Even Heat for 200-gal Glass-lined Reactor

Safety, freedom from maintenance, and low capital expenditure are other factors that led plant to choose electrical method for heating large vessel

GORDON WEYERMULLER, Associate Editor
with **STUART McCABE,** Plant Engineer
Miranol Chemical Company
Irvington, New Jersey



Electrically heated, glass-lined reactor at Miranol Chemical. Lower portion of vessel is below platform
Photos by CP Staff

Problem: When installation of a 200-gallon, glass-lined reactor at Miranol Chemical was being planned, company had the choice of a number of methods of heating vessel.

Consideration was given to heating reactor with high-pressure steam. Plant, however, did not have a large enough boiler to furnish this additional steam. Also, according to the laws of New Jersey, plant would have had to hire a licensed fireman. Chemical heating was also investigated, but was found to require a higher capital outlay than desired.

Vessel was to be used for condensation of amino ethanolamine and a fatty acid (lauric acid or coconut oil) to form an amino amide. Since the amine is highly corrosive, the glass-lined vessel was required. Even heating with a gradual rise in temperature was necessary for proper control of reaction and to avoid damage to glass lining. Use of a glass-lined vessel was necessary to insure a product free from contamination.

Solution: Since plant found that a suitable electrical system could be obtained to heat vessel for a comparatively moderate expenditure of about $2000, this method was selected and placed in operation in June 1957. Choice was partly based on plant's favorable experience with this electric mantle method of heating glass vessels of about 25-gal capacity.

Heating system has eight circuits or zones of heat, three on the bottom and five up the side. These zones are controlled by four rheostats on control panel. Heat can be varied over different portions of vessel as desired. If a small batch is processed, circuits on upper part of vessel can be entirely closed off.

Coils are installed in a circular manner, distance between individual turns being about 2". By this method, heat input is provided for every square inch of vessel's surface.

Each circuit is 5000 watts, 280 volts, and draws a maximum of 18 amperes. Total input is about 40 kva. Each circuit consists of two coils of No. 16 Nichrome V wire connected in parallel to one pair of nickel leads. Coils and leads are enclosed in ball-and-socket refractory beads.

Ceramic-covered heating coils are sewed to asbestos fabric which has fine nickel wires woven into it in order to strengthen it. A covering layer of asbestos fabric also goes over coils.

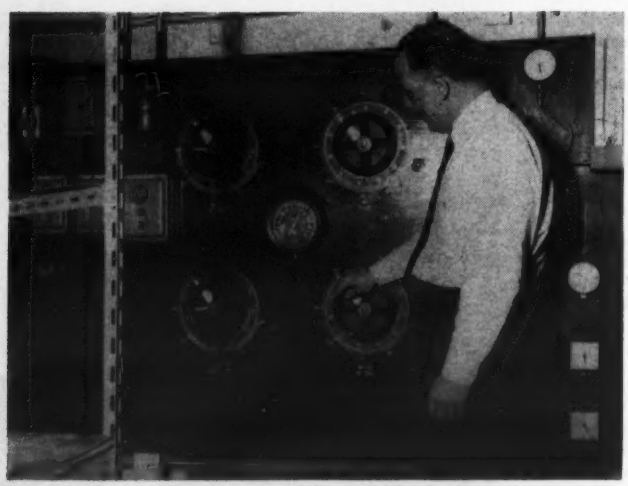
At Miranol Chemical, this heating mantle is enclosed in an aluminum jacket for protection from possible mechanical damage.

Results: Electric heating system has provided even heating for reactor and helped plant make a high quality product for amphoteric surfactants for use in the pharmaceutical, cosmetic, and other industrial fields. Vessel is heated from 25 to a maximum of 200°C.

Even heating also prevents damage to glass lining that might result from uneven heating. This installation is the largest glass-lined vessel heated this way of any in the country as far as is known.

No maintenance has been

To page 69



Adjustment is made to one of four rheostats used to control zone heating

New Solutions section continues on page 66.

SECTION HIGHLIGHTS

Bigger job ahead for the material-handling engineer 32

Major packaging changes coming in chemical process industries 33

Automatic filling line hikes oil can output to 600/minute 34

Wear-resistant static controls guide complex conveying set-up 38

Putman survey tells trends, problems in CPI bulk conveying 40

Pasted-bottom multiwall bag cures resin-handling headache 54

High-purity shipping by pneumatic conveyors, collapsible bins 58

Soda ash bagging and loading now neater, easier, more efficient . . .62

A CHEMICAL PROCESSING FEATURE
MATERIAL HANDLING & PACKAGING

Starts here . . . CP Feature on

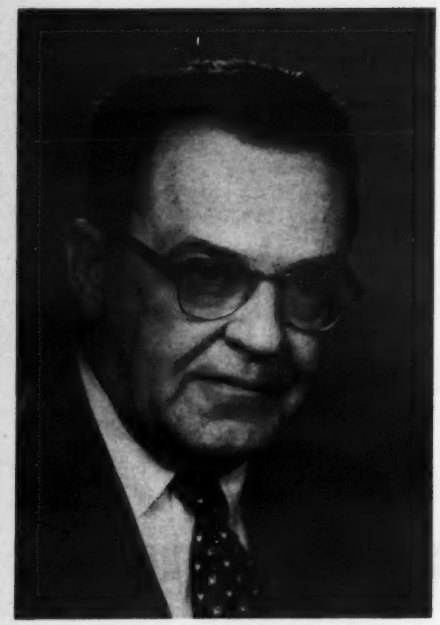
Material Handling & Packaging

Bigger Job Ahead

FOR MATERIAL-HANDLING ENGINEER

Will play larger part in process design, work more closely with purchasing and distribution departments, help customer solve his handling problems

C. H. WOLF
Materials Handling Engineer
The Dow Chemical Company



Mr. Wolf is supervisor of the Materials Handling Section of The Dow Chemical Company's Engineering Department, Midland, Mich. He has been with Dow since 1945, serving as design engineer prior to assuming his present responsibilities.

For the past several years, Mr. Wolf has been a speaker at a number of material handling conferences in the U.S. and Canada, and has been guest lecturer at the Materials Handling Training Conference at Lake Placid, N. Y. He is a member of the Materials Handling Advisory Committee of the National Security Industrial Association and in this capacity has served on several task committee assignments for the Armed Forces.

Mr. Wolf is also a member of the American Materials Handling Society and the National Society of Professional Engineers.

DESPITE the tremendous engineering advancements of the last ten years, chemical-processing management has not readily accepted the fact that material-handling engineering is a specialized field requiring special training. There are several reasons for this:

1) The chemical industry, unlike the "hard goods" industries, is not primarily concerned with mass-production techniques. 2) Handling within a chemical process is dictated for the most part by the process itself, or by the characteristics of the material to be handled. 3) The choice of handling equipment adaptable to processing has been rather limited.

Therefore it has been considered a function of the process engineer to change the handling methods as he changed the process.

More Management Concern

However, as chemical plants have grown in size and capacity, so have the number of handling problems. Thus, management is beginning to realize the need for 1) engineers trained in the field of material handling, and 2) a well-planned material-handling program.

This was demonstrated when, in 1956, we questioned 22 large chemical companies concerning their material-handling programs. Six of 19 companies replying to the questionnaire had established full-time groups of engineers whose sole responsibility was material handling. Ten had elected to spread the responsibility among several engineers, as an adjunct to their other duties. Only three companies said they had no established program or procedure for treating material-handling problems.

It's also interesting to note that the chemical industry is sending many more people to material handling shows and conferences than ever before.

Today the material-handling engineer is principally concerned with problems that fall outside the process itself: yard handling, warehousing, receiving, shipping.

There are also the problems of packaging—or what should probably be termed package-filling to differentiate these problems from those of package design.

This type of handling, because it must be performed by a combination of men and machines, accounts for approximately 95% of all handling costs in the industry. It therefore offers a very lucrative field for cost reduction, and is one not apt to be depleted of problems for some time to come.

Recent Trends

In recent years we have seen many distinct trends develop. Most prominent has been the swing to bulk handling of finished and raw products. This has brought advancements in pneumatic conveying, which is now applied to many materials previously thought unsuited for handling in this way.

Of equal importance is development of bulk containers that serve for both shipping and storage. Much progress has also been made in perfection of corrosion-resistant interior coatings for storage bins.

We are now witnessing a trend toward completely automatic packaging. This permits filling of bags and drums much more rapidly and with much greater accuracy.

Warehousing has also come in for its share of changes. Development of fork trucks with shorter turning radii and triple-lift masts has helped reduce warehouse size. New building materials have simplified design and lowered costs of warehouses. The recently developed pole-type building, constructed for as little as two dollars per square foot, has proved very successful for chemical storage.

It is conceivable that the chemical plant of the future may not require any warehouse space at all. Bulk storage, combined with accurate and rapid packaging, will permit small orders of less than car- or truck-load lots to be packaged as received.

Containers will be received, as required, from a nearby source. Delivering unit will then serve for storage, and as containers are filled they will be loaded immediately onto a common-carrier unit. Large orders of car- or truck-load quantities will be handled directly from storage units into bulk containers or bulk cars and trucks.

One foreseeable trend is the broadening of the material-handling engineer's function.

To page 42

Contract packaging isn't just a dream. It may be nearer than you think. But until production line ouput is packaged, labeled, and shipped for you direct to customer, what does the present and immediate future hold? This expert uses his "educated imagination" to assert that . . .

Trends Indicate Packaging in CPI Due for Big Changes

Robert F. Uncles,
Manager
Packaging and Labeling Section
American Cyanamid Company
New York, N. Y.

IS THE dream of contract packaging unrealistic?

We don't think so. In fact, the day when production line output will be taken out of your hands to be packaged, labeled, and shipped direct to customers might be nearer than you realize. It already is becoming a reality in the consumer specialty product field. So why, then, should it be a dream in chemicals packaging?

But until such time as contract packaging is an accomplished fact, certain definite packaging trends are evident in the chemical processing industries. Many are concerned with filling and handling containers rather than with drastic changes in containers themselves.

One of the more obvious trends in packaging and shipping dry solids by chemical processors lies in the application of the unit load principle to bagged material. Here we can predict, with considerable confidence, certain future developments.

One development is in expendable pallets. As absolute minimum in pallet cost is approached, palletizing adhesives and handling equipment will be developed, permitting preparation and handling of unit bag loads without a pallet. This already has been accomplished with cartoned material.

We will see an ever-increasing swing to pasted rather than sewn bags because of superior stacking properties when filled.

Moreover, we can anticipate standardization of length and width dimensions of all bags (to accommodate a standard dimensional pattern of the unit load for optimum handling and shipping). There will be a wide range of gusset or pasted end dimensions available to permit packaging of standard weights regardless of product density.

Semi-bulk Shipments

A second trend is the growing popularity of semi-bulk shipments of dry products. ("Semi-bulk" is usually taken to mean 1000 to 3000-lb units in expendable containers and up to 10,000-lb units in returnable containers.)

Cost is an important factor in constructing semi-bulk units. It has been estimated a break point in bag vs. semi-bulk packaging costs is reached at about 2 million lb per year for expendable bulk containers and at roughly 4-5 million lb for returnable bulk containers. Chemical processors must therefore justify the added costs in terms of retaining and promoting customer satisfaction.

There is a tremendous market potential for semi-bulk units between small users and those who receive materials in true bulk. Since most of this potential is in the area below the break point for the processor, considerable effort must be directed toward cost reduction.

Cost-cutting steps already have been taken by using an interior cylinder tangential to the sidewalls of the box, and by introducing transverse creases to prevent bulging.

We predict many variations will be introduced, and a combination of materials and design will finally result in an expendable unit which will compete sucessfully in cost with multiwall bags at low volume rates.

Besides having required strength, this package will be so designed that set-up time, an important cost factor, will be practically eliminated. And, very dimly, one can see one-piece units fed from a magazine, automatically formed, filled, sealed, and delivered to the storage area on conveyors with no manual operations involved.

Bagged Materials

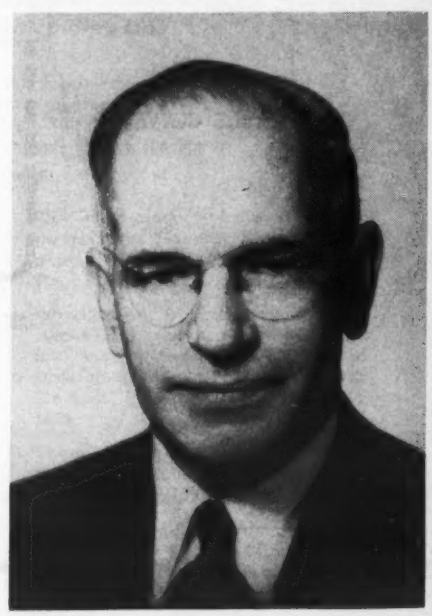
There is a growing trend in packaging certain classes of chemical products which is in direct contrast to the swing to semi-bulk units. We refer to increasing demand by customers for bagged materials in smaller and smaller units — 50-lb containers are gaining

To page 116

The day after he was graduated from Rutgers University in 1937, Robert F. Uncles joined American Cyanamid Company. He started in the firm's Stamford Research Laboratories and worked through various jobs to his present position as manager of the Packaging and Labeling Section, Operations Engineering Department, with headquarters in New York City.

His interest in packaging goes back to 1947, when he set up and operated a package testing and development laboratory at Stamford. Within two years it grew from a part-time activity to a full-time job with two assistants.

His activities in the packaging field include: vice chairmanship of the Chemical Packaging Committee, Manufacturing Chemists' Association; secretary of Committee D-10, shipping containers, American Society for Testing Materials, and official representative of his company in the Packaging Institute.



Recognition that forthcoming packaging advancements could be exploited led Texaco to plan ahead. Two years of study and equipment inspection is paying big dividend because . . .

Automatic Filling Line Hikes Motor Oil Can Output to 600/min

Problem: Forthcoming advancements in packaging techniques threatened to surpass, from the standpoint of processing speed and operating personnel required, one-quart motor oil packaging facilities at The Texas Company's Port Arthur Works.

Designing an automated packaging line was complicated because of the small area available for installation of numerous pieces of equipment.

Solution: Two years were spent in exhaustive studies and inspection of newly developed equipment before a one-quart-can, 24-per-case, fully automated filling line went into operation in spring 1958. It has a maximum continuous processing speed of 600 cans/min.

Although new from end to end and fully automated, filling line was so designed and installed that it was not necessary to revise overall packaging operation.

Line Flow

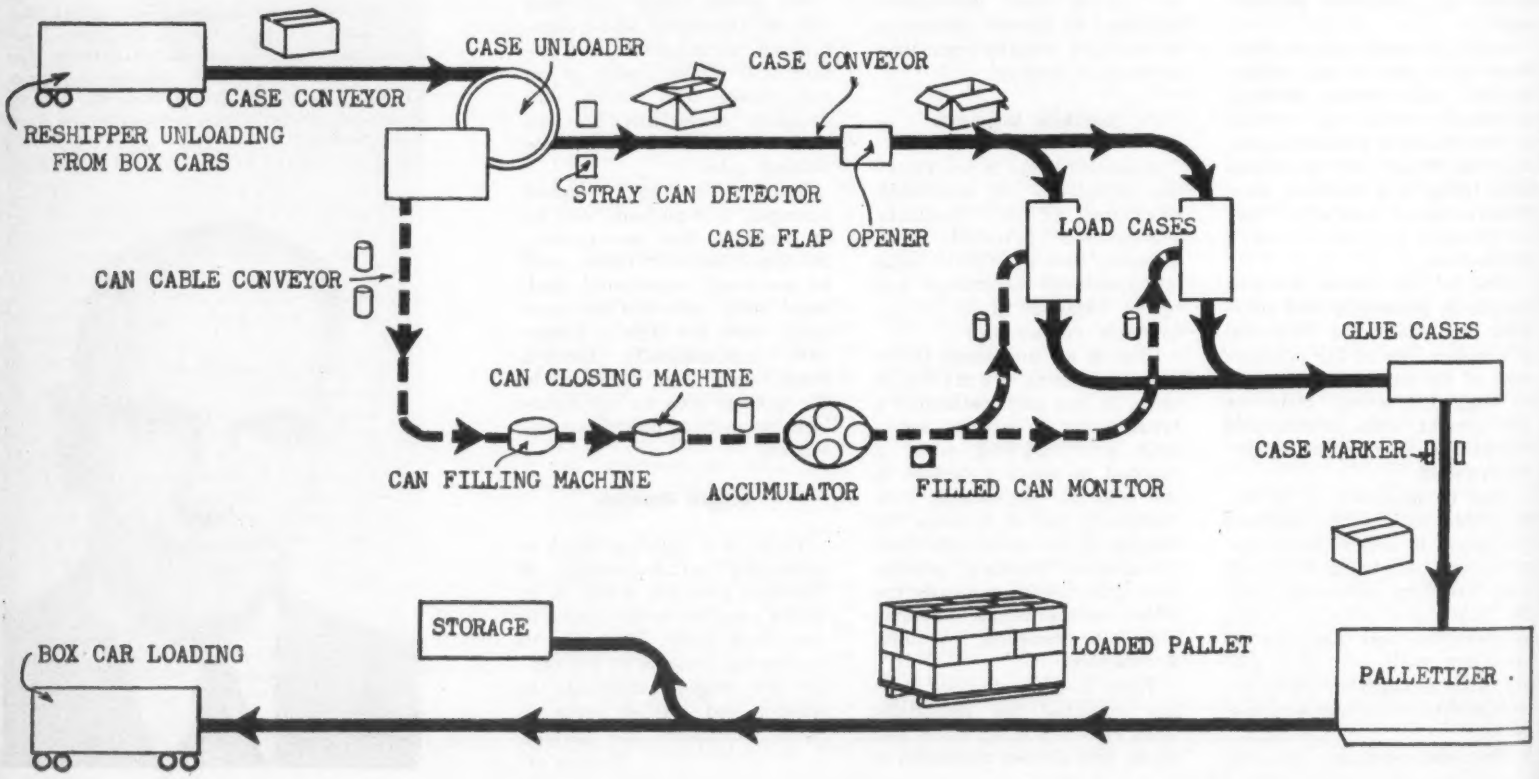
Empty one-quart cans are received in reshipper cases from boxcars. Two men use portable conveyors to unload cases onto a belt conveyor. Cases are transported through a storage area where incoming receipts are balanced with line requirements. But normal flow is direct from boxcars to automatic can unpacker on second floor.

Approximately 10 minutes of empty-can supply is maintained on incoming conveyor system. This system is automatically controlled through a section of gravity conveyor equipped with photoelectric eyes.

Unpacking Section

Case unpacker has maximum output of 600 cans/min. An operator, stationed at exit of unpacker, monitors operation. He also makes general inspection of empties prior to their delivery via overhead cable conveyor system to filling machine.

Electronic device, utilizing magnetic sensing head located in conveyor beneath case, detects presence of empty cans remaining in case after it leaves unpacker. Detection energizes air valve, which ejects case containing stray can from conveyor line. Case packers located farther down line thus are protected from being damaged by empty cans which would otherwise remain in reshipper cases.



The 36-pocket, positive-displacement filling machine has a no-can-no-fill device. Drain pans built into filler facilitate fast flushing during grade changes. These are frequent because of Texaco's system of operation. Permissible filling speed is limited only by temperature and viscosity of product.

Equipment permits cans to be filled with little or no spillage. As a result, cans and cases do not become oil-stained. Piston and valve rollers and valve trip cams are the only wearing parts on filler. All are easy to replace. There are no connecting rods or wrist pins to cause trouble.

Can support rails are easily and positively adjusted, eliminating spillage by compensating for centrifugal forces generated during high-speed filling. An accelerating infeed screw pushes cans in uniformly without jamming.

From filling machines, cans are conveyed to six-spindle, hydraulically driven closing equipment, capable of continuous speeds up to 600/min.

Cases of lids are conveyed from second floor storage area direct to workside of operator at closer. This is the only portion of the line requiring continuous and uninterrupted attention of an operator.

Closing machine discharges sealed cans onto accumulator belt and turntable. This forms a surge-area for emptying filler and seamer of cans should automatic shutdown of line occur due to a mishap downstream from these units.

A solenoid-operated gate at entrance to filler stops the flow of empty cans. Gate is interlocked with safety switches located at strategic points in line.

When leaving turntable, cans are conveyed through an X-ray height-of-fill monitoring device which detects those filled below an acceptable level. An air blast rejector automatically ejects improperly filled cans from conveyor line.

Casing Operation

Two packers automatically load filled cans into reshipper cases. Each packer has a capacity of 13.5 cases/min.

While cans are being filled, closed, and monitored, empty cases from unpacker are transferred by gravity and belt conveyors to a flap opener, which insures that all flaps are opened outward.

Just beyond flap opener, cases pass through a switch track conveyor section which maintains a supply of empty cases ahead of each packer. Guides keep case flaps in outward position.

Cans are handled in the packer in a vertical position. Cans are delivered into each case through a system of reciprocating grids which meter 24 cans into each case.

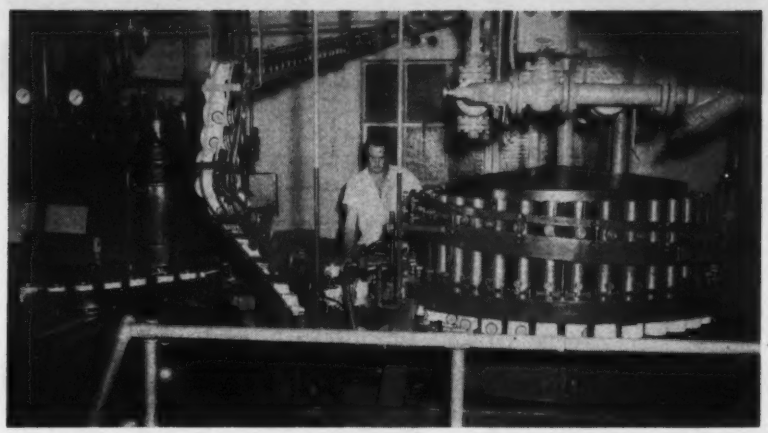
Gluing and Palletizing

As filled cases leave packers, they are returned to a single powered roll conveyor line and are delivered to an automatic gluing machine, which has a maximum capacity of 27 cases/min.

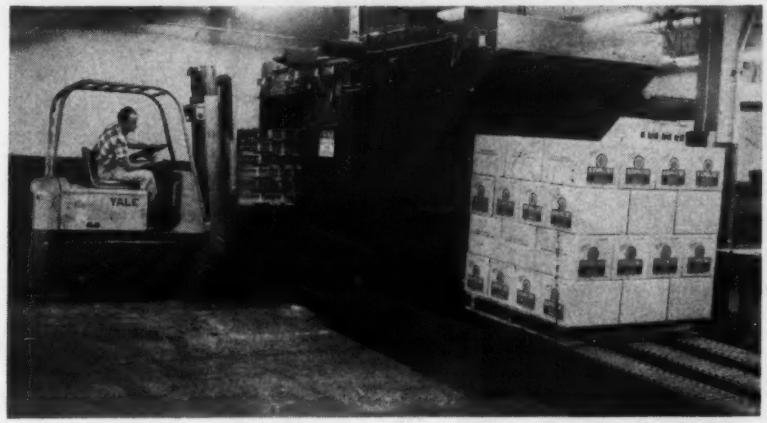
After gluing and sealing, identifying marks are affixed by a pair of automatic markers. An incline conveyor transports filled cases overhead to an automatic case palletizer, which has a maximum capacity of 35 cases/min. The older 400-can/min one-quart or the five-quart filling line also can be directed through palletizer as necessary.

A single lift truck delivers empty pallets into palletizer's magazine and transports loaded cases to palletized storage. Filled cases are now ready to be put into boxcars and highway carriers for distribution to customers.

Results: Output of one-quart filled cans has been increased substantially. On the older line, 350-400 cans/min were produced dependent upon product temperature and viscosity. This limit has now been increased to 550-600



A 36-pocket positive-displacement filling machine and a six-spindle hydraulically driven closing machine are two of the key pieces of equipment in Texaco's automatic can-filling line. Automatic gate which controls supply of empty cans to filler is near center of picture



Side-loading automatic palletizer handles 35 cases/min of motor oil. Fork truck driver handles entire palletizing and storing operation

Manufacturers Providing Key Equipment In Texaco Automatic Filling Line

(Key number appearing after each listing refers to the corresponding number on reader service slip opposite last page of this issue. Use number when inquiring for more information on specific items.)

Reshipper case unpacker is development of Radio Corporation of America, 30 Rockefeller Plaza, New York 20, N. Y. Check No. 1555.

Empty can detector device is manufactured by Peerless Equipment Company, 111 Ortega Ave., Mountain View, Calif. Check No. 1556.

RPL-21 filling machine is product of The Pfaudler Co., a division of Pfaudler Permutit, Inc., Rochester 3, N. Y. Check No. 1557.

Can closing machine is development of Continental Can Co., 100 East 42nd St., New York 17, N.Y. Check No. 1558.

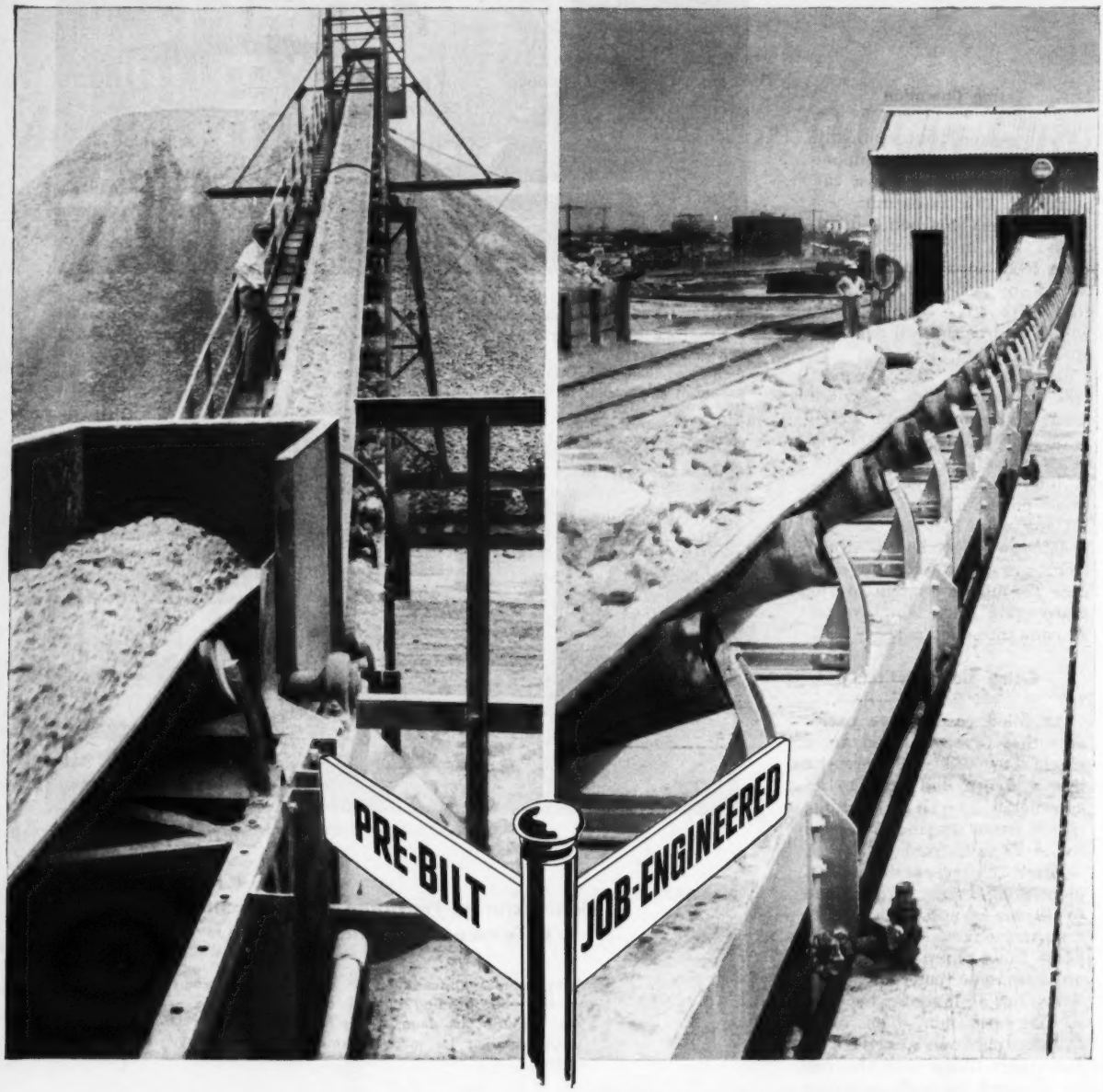
Can height-of-fill monitor, the Hytafill,® is a product of the X-Ray Department of General Electric Company, Milwaukee 1, Wis. Check No. 1559.

Standard-Knapp can casing machines and case sealing equipment are developments of the Portland Division of Emhart Mfg. Co., 125 Main St., Portland, Conn. Check No. 1560.

Shipping markers are products of Adolph Gottscho, Inc., Hillside 5, N.J. Check No. 1561.

Automatic palletizer is manufactured by the Lamson Corporation, 303 Lamson St., Syracuse 1, N. Y. Check No. 1562.

Choose your route to lower handling costs



Modernize for greater profit with a LINK-BELT belt conveyor system

BELT conveyors have proved themselves the giant of industry for low-cost, bulk materials handling. And additional benefits offered by Link-Belt contribute even more to this inherent economy.

LINK-BELT PRE-BILT SECTIONAL BELT CONVEYORS are pre-engineered . . . avoid need for detailed drawings. From standardized data, Link-Belt engineers prepare "on-the-site" quotations. Interchangeable, standardized parts speed selection, reduce purchasing costs.

LINK-BELT JOB-ENGINEERED BELT CONVEYORS. As a single source for design, equipment and erection of these systems, Link-Belt spares you coordination problems involving drawings and equipment . . . prevents waste of your engineering manhours.

For full details on both types of conveyors, contact your nearest Link-Belt office. Ask for 40-page Pre-Bilt Catalog 2779. 15,022

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

Check 1563 opposite last page

cans/min. A total of 9213 cases, each containing 24 cans have been packaged in an eight-hour shift by one crew.

Only seven men are used for the complete operation, whereas 12 were needed before on the old equipment at lower output. Texaco's complete line of motor lubricants in one-quart round cans can be filled on the new facilities.

Convert electric truck line to hydraulic lift; other modifications made

Changes enable some models to double lift speed

Uses: Multi-purpose lift trucks for 3000- to 10,000-lb loads.

Features: Conversion to hydraulic lift has increased lifting speeds of manufacturer's entire electric K41 model line. Some models are now capable of a lift speed double that formerly possible.

Magnetic control makes possible an operating range of four speeds forward and reverse. Hydraulic brakes also have been added, as well as a parking brake on motor to provide additional safety.

By applying hydraulic lift to standard truck, wide variety of hydraulically controlled attachments for specialized handling jobs can be used.

Description: Speed is controlled through a hand-operated accelerator with an automatic time delay between each speed to provide smooth acceleration.

Brakes are sealed against dirt. They are self-adjusting and self-energizing in either direction. Thus a minimum of foot-pedal effort is required for safe stopping and truck control. Brakes can be applied through either a step-up or step-down brake pedal arrangement.

(K41 electric lift trucks were developed and modified by Yale Materials Handling Division, The Yale & Towne Manufacturing Company, 11,000 Roosevelt Blvd., Philadelphia 15, Pennsylvania.)

Check 1564 opposite last page.

GAYLORD SERVES YOU
FROM SEEDLING TO STYLING

From forest to paper mill to design and printing, Gaylord constantly searches out new ways to improve your packaging operations.

All this experience and creative technology support the G-Man who works with you. Whether you need corrugated boxes by the millions or engineered packaging, it costs no more to call your Gaylord man. He's resourceful.

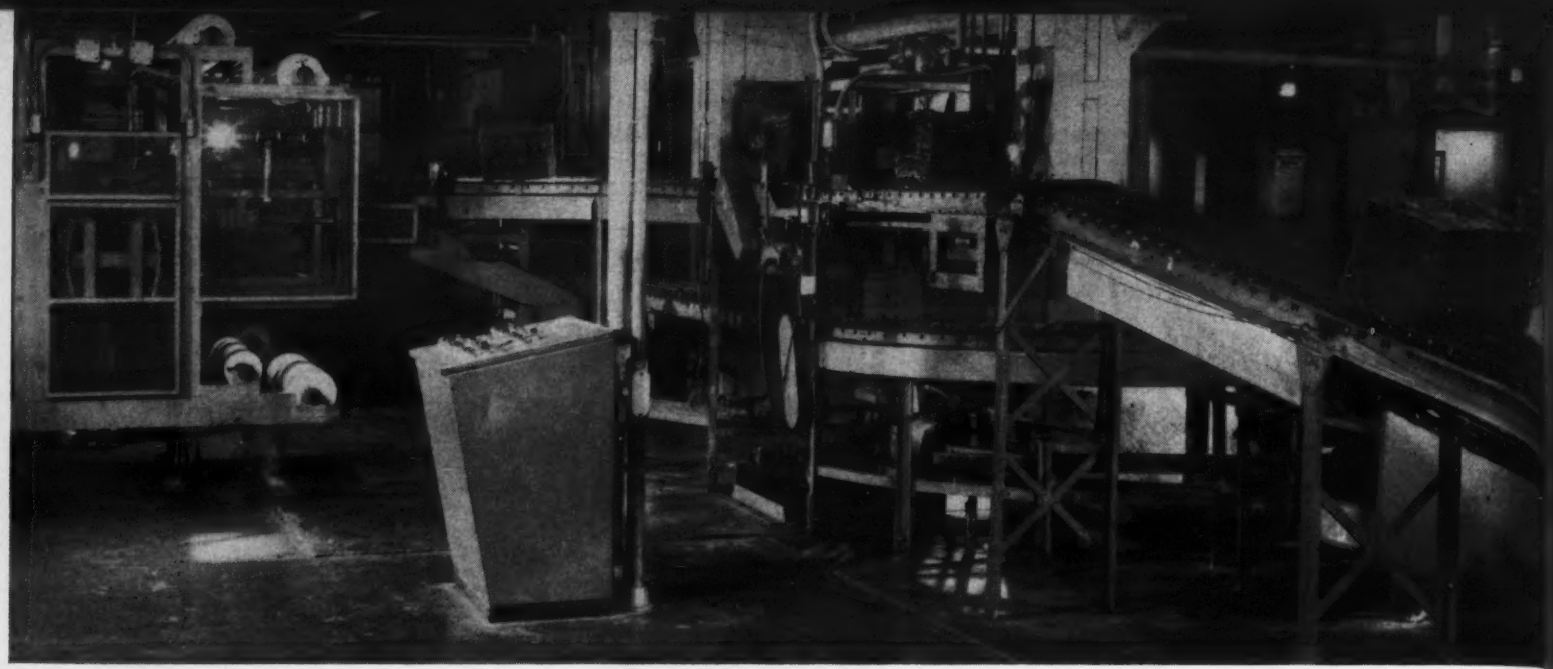
For more information on product at right, specify 1565 see information request blank opposite last page.

GAYLORD
CONTAINER CORPORATION

Gaylord Boxes

HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

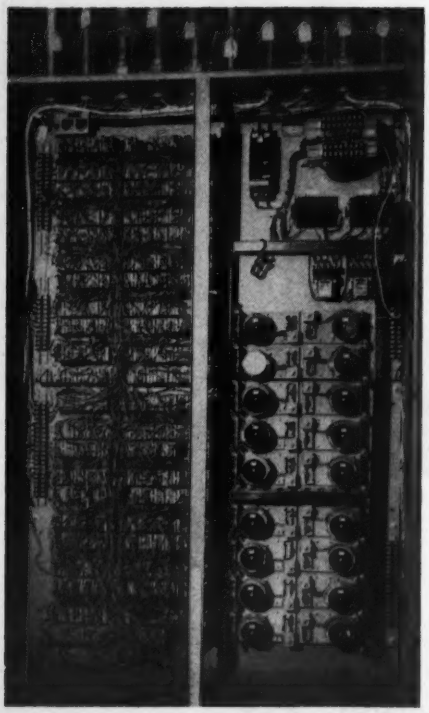
DIVISION OF **Crown Zellerbach Corporation**



Half of collecting conveyor system in use at Humble Oil. Other half is in background. Transfer elevator is in center, manual control left of center, and wrapping machines at left

Humble Oil Uses Static Controls for Complex Conveying Operation

Switching system with no moving parts employed for handling bales of rubber has advantages of reliability, flexibility, and elimination of corrosion and wear problems



Interior of static switch control panel

GORDON WEYERMULLER
Associate Editor

Problem: Conventional relays used for processing control systems are subject to wear from movement. Corrosive fumes, salt air, or moisture may affect such switches adversely.

Solution: To overcome these problems, Humble Oil decided to install a static control system for operation of conveyors handling bales of rubber. System was placed in operation in Sept. 1958.

Static controls, developed through the solid-state physics concept, have no moving parts. Basic circuit consists of two windings of proper design placed on a grain-oriented magnetic steel, plus rectifiers and resistors. A 50% nickel-50% iron grain-oriented alloy is typical material used for core.

At Humble Oil the static electrical setup controls a system of conveyors which collects bales of rubber coming from four cutting and stacking machines. These bales are then automatically fed to either one or both of two wrapping machines.

System is divided into two parts — each having two cutting and stacking machines and one wrapping machine — connected by a transfer conveyor. This transfer conveyor allows all four of the cutting and stacking machines to feed into either of the wrapping machines. Cutting and stacking machines are connected to wrapping machines and to transfer conveyor by an elevator transfer conveyor.

Three methods of operation, manually set by one selector switch, are provided:

1—Bales from Cutters A and B to Wrapper 1 and/or bales from Cutters C and D to Wrapper 2
2—Bales from Cutters A, B, C, D to Wrapper 1
3—Bales from Cutters A, B, C, D to Wrapper 2

Once the sequence of operation is selected and the "start" button pressed, conveyors automatically collect bales of rubber and transfer them to pre-determined wrapping machine.

Static photoelectric limit switches are used to sense

the presence of bales of rubber. Static (contactless) limit switches, operated by the elevator, control the operation of conveyor on the elevator. Output signal from any sequence of static switch components is amplified for operating reversing and non-reversing starter control coils without interposing relays.

Since there are no provisions for storage of rubber once it has entered finishing process, prior to packaging, continuous operation of conveyor system is essential. Hence, electrically independent manual control panels are installed in strategic locations, for use in case of any temporary disruption of static system. Manual control of any part of collecting conveyor system does not affect automatic operation of the remainder.

Results: Static system offers the advantages of reliability and long, trouble-free operation. Absence of moving parts eliminates switch wear. Static switches are not affected by corrosive vapors or hot, damp, salt air. Flexibility of operation is furnished by the static system.

(For further information on static switching system check 1566 opposite last page.)

(For further information on conveyor check 1567 opposite last page.)

SECTION COVER

. . . on page 31 shows an H-25 Payloader tractor-shovel in action at G. B. C. Chemical Corporation's new fertilizer plant in Fairmount, Indiana. The vehicle unloads railroad cars, also moves material from storage bins to mixing operation. It handles up to 400 tons during 10-hr period when plant is in full production.

(The Payloader is a product of The Frank G. Hough Co., Libertyville, Illinois.)

Check 1568 opp. last page.

North American's new MARK-20 20,000 gallons in one load!

Here is the car railroads have been waiting for to compete better with other forms of transportation. The MARK-20 offers shippers economies in leasing rates, demurrage costs, and handling charges. The MARK-20 offers the railroads lower operating costs and in turn advantage can be taken of incentive rates with higher minimums.

Compare the following load limits!

The MARK-20—approx. 180,000 lbs.

8,000 gallon tank car—approx. 90,000 lbs.

Highway truck maximum—approx. 45,000 lbs.

North American Car will custom build the MARK-20 to shipper's specifications. The car can be insulated, coiled, or compartmentalized. It is domeless for greater strength and can withstand pressure of 100 lbs. per square inch compared with 60 lbs. of most other tank cars.

Other Features of the
MARK-20

- Electrically welded—no rivets
- Six-inch bottom unloading
- Top unloading device
- 100-ton easy riding trucks
- Outside operated valve
- Hinge bolted 18″ manway
- Tell-tale load gauge
- High capacity 36″ draft gears
- Roller bearings

Write, wire or phone for full details today

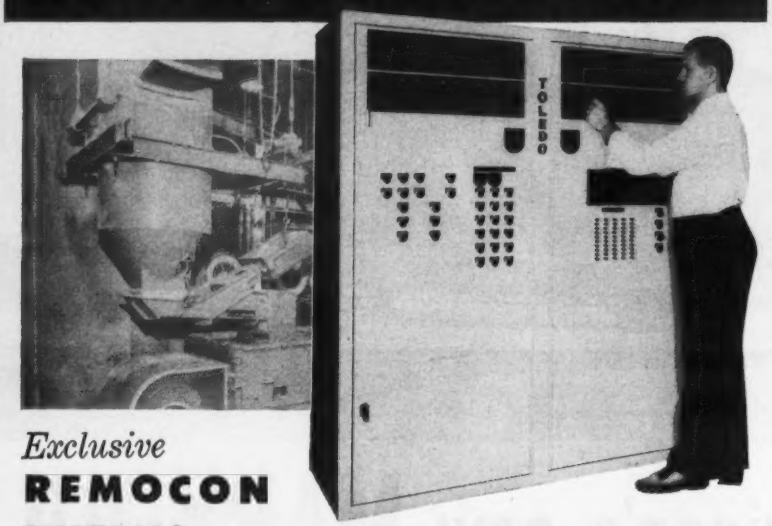
NORTH AMERICAN CAR CORPORATION

231 South LaSalle Street, Chicago 4, Illinois
Telephone Financial 6-0400

Shippers! Here is the way to reduce your distribution costs and restore traffic to the rails

Check 1569 opposite last page

TOLEDO: Prime Source of
IDEAS and EQUIPMENT To Solve Your
MATERIALS CONTROL PROBLEMS



Exclusive
REMOCON
SYSTEMS... provide Automatic Remote Control of single or multiple scale batching systems!

Control at a convenient remote location is yours with Toledo Remocon. Scale cutoffs adjust instantly for the proportioning requirements of each batch formula . . . no manual adjustments at scales required.

Flexibility allows setting up one formula while another is batching. Any portion of a batch may be run without resetting. Up to 20 or more ingredients can be cumulatively batched into a single weigh hopper. Formulas may be introduced by punch-card or batch board. Weight data may be recorded remotely.

WRITE TODAY for our Bulletin 2964 on modern Toledo Batching Equipment . . . or for specialized help from our Custom Products Engineering Group in solving your problems in batching, weight data processing, counting or classifying.

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TOLEDO SCALE, Division of Toledo Scale Corporation
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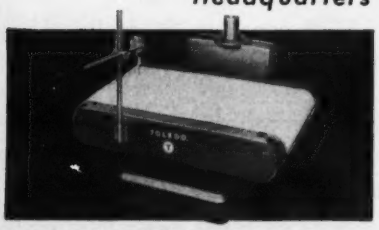
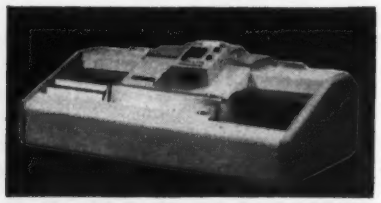


AUTOMATIC CHECKWEIGHING
Continuous, 100% in-line checkweighing of items from 50 to 200 lbs. at speeds to 40 per minute! Handles sacks, cartons, packages, pieces, parts. Motorized belt—fits into conveyor lines. Numerical counters, remote indication, other features. Ask for Bulletin 2968.



DATA PROCESSING
Weight data and figures can be transmitted from scales to any remote location—to be typewritten, numerically listed and totaled, stored for delayed recording, recorded by tape punch or introduced into a data processing system—all automatically!

Check 1570 opposite last page

MATERIAL HANDLING & PACKAGING

Survey probes trends, problems in CPI bulk conveying

- **Sees pneumatic-system use growing**
- **Puts plugging at top of "headache" list**

How are bulk materials being handled in chemical processing plants? What trends are indicated for the future? What are the biggest headaches in bulk-conveying methods today?

The editors of Chemical Processing magazine set out to find the answers through a survey conducted by the Research Department of Putman Publishing Company. A total of 142 plants took part in the survey. They produce inorganic, organic, and other chemical products; cement and clay products; paper and petroleum products.

Future Trends

According to those replying to the questionnaire, the future looks bright indeed for pneumatic conveyors. Close to one-half of those indicating some sort of future trend stated that this type of handling was the one to watch.

Survey results also show that vibrating or oscillating conveyors are very much in the running for the honors, too.

It appears, however, that the trend toward pneumatic, vibrating, or oscillating conveyors may take a little while to reach full fruition. Surveyees reporting on handling systems proposed for the near future were contemplating installation of just about as many of those old standbys, belt and screw conveyors, as of some type of pneumatic systems.

Here's a sampling of comments of those giving the nod to pneumatic, vibrating, or oscillating conveyors for future honors:

"Fluidizers are proving very satisfactory for hard-to-handle materials."

". . . pneumatic trends are increasing."

"Pneumatic. High pressure tends to be installed on new installations and replace older equipment as necessary."

"High- and medium-pressure pneumatic conveying systems replacing low-pressure pneumatic systems."

"Are considering vibrating type."

"Vibrating type replacing belt and bucket units."

Evidently, length of conveying line plays at least some part in decision as to type: "Vibrating conveyors and pneumatic systems where distance is short."

Current Problems

What are the headaches connected with operating conveying systems? The survey revealed that sticking, caking, plugging, and hold-up are leading candidates causing recourse to the aspirin bottle. "Maintenance" wasn't far behind in bringing about that dull, headachy feeling.

Other problems (in descending order): abrasion, dusty conditions, corrosion, lump breakage or product degradation, dust-filter operation.

Here's a brief sampling of the 162 comments received:

"Wear due to abrasiveness of materials handled."

"Worn belt rollers; cleaning belts; constant feeding; handling hot materials."

"Moisture in salt causes caking in bins and conveyors."

"Abrasion—dust control—heat."

"None except mechanical deterioration."

"Abrasion is our No. 1 problem in bulk conveying."
"Durability."

Present Use Pattern

Rank order of major types of mechanical conveyors now being used in surveyed plants, in terms both of number of plants using such equipment and total number of lines used, is, in descending order: screw, belt, bucket-elevator, vibrating, en masse.

However, in terms of total *length* of mechanical types in use, the rank, in descending order, is: belt, screw, bucket, en masse, vibrating.

Eighty-three plants reported they had a total of 4135 mechanical bulk-conveyor lines. Maximum number of lines in a single plant is 618; median is 16; arithmetic average is 50.

Eighty plants reported a total length of mechanical conveyor lines of about 178,000 ft. Maximum length is 28,200 ft; median is 800 ft; arithmetic average is 2240 ft.

Forty-seven plants reported a total of 246 pneumatic lines. Maximum in any plant is 60 lines; median is 2.5 lines; arithmetic average is five lines.

The same 47 plants reported a total length of pneumatic lines of about 40,000 ft; maximum, 9500 ft; median, 300 ft; arithmetic average, 850 ft.

Additional Facts

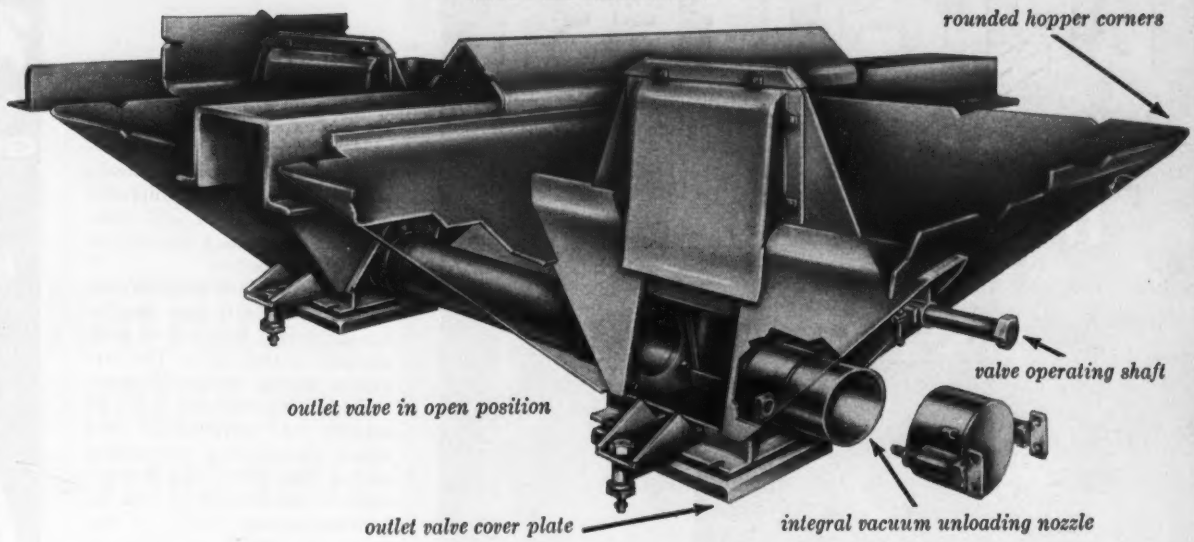
Other highlights of the survey (published January 1959):

1) About one-half (48%) of surveyed plants made most recent conveyor installation in 1958; 15% in 1957; and 13% had made no such installation since 1953.

2) At time of replying to questionnaire, 45% of the plants said conveyor lines or systems were either planned or contemplated.

3) Purchaser's own engineering department is predominant factor in designing or preparing specifications, participating in 98% of the cases. Conveyor manufacturer participated in 47% of the cases, and a consulting engineering firm in 7%.

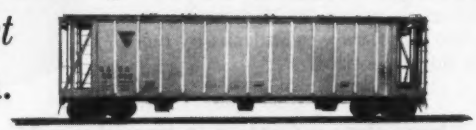
HOPPER ASSEMBLY



PROTECTED UNLOADING GATES OF DRY-FLO* CAR KEEP LOAD SAFE FROM CONTAMINATION

Unloading gates of the DRY-FLO car are entirely within the car insuring ease of operation and eliminating pickup of foreign material. Gates open and close vertically and are not subject to pressure from within. The rate of flow of product through the unloading gates can be adjusted as desired.

The DRY-FLO car is ideal for bulk shipment of dry ingredients, particularly products that *must be protected* from contamination.



COMPETITIVE IN PRICE WITH OTHER COVERED-HOPPER CARS—DO SO MUCH MORE

**GENERAL AMERICAN TRANSPORTATION CORPORATION*

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DRY-FLO CAR DEPARTMENT

135 South LaSalle Street • Chicago 90, Illinois
In Canada: Canadian General Transit Co., Ltd., Montreal
Offices in principal cities

Check 1571 opposite last page

HARRISBURG CYLINDERS

Gas cylinder quality depends on both design and manufacturing ability. When you consider these factors you will realize why you can't surpass the experience (over 100 years), the manufacturing facilities (the world's largest), and the forging techniques (the world's most time-tested) that determine the quality of Harrisburg Seamless Cylinders.

Every step of the closely controlled operation is a Harrisburg responsibility. From open hearth furnaces, through hot-drawing, necking and machining into final inspection and testing, quality and uniformity are paramount. Without a match in demonstrated service life, the Harrisburg cylinder is by far the brightest star in its field.

More than a Century in Harrisburg 24, Pa.

H HARRISBURG STEEL CO.

Division of HARSCO CORPORATION

Check 1572 opposite last page

Handling Engineer

From page 32

He can expect to play a larger part in design of new processes and plants. His knowledge of handling equipment and its application will continue to serve as a foundation for cost reduction.

Purchasing and distribution departments will also require his services if they are to keep abreast of the times. The engineer should advise the purchasing department on all aspects of purchasing that affect handling procedures within the plant. His knowledge of handling may also be a determining factor of the form in which a material should be purchased, and in what quantity.

Distribution and traffic departments, responsible for selection of carriers and operation of terminals, encounter many material-handling problems. These can easily be of such magnitude and quantity as to warrant employment of a material-handling engineer full time.

As the trend toward bulk handling progresses, the possibilities for terminalizing products in bulk becomes ever more enticing. The ultimate in cost reduction, in the area of distribution, is reached when terminalization is combined with packaging and shipping.

It will also be necessary to assist the customer in *his* handling problems, as handling becomes more specialized. This service, a major adjunct to selling, will of necessity become a function of the material-handling engineer, working with his company's technical service group.

Cost Accounting

Unfortunately, very few industries have considered handling costs to be of sufficient importance to segregate them in their cost accounting. The engineer, however, if he is to justify his recommendations on an economic basis, must know the existing handling costs. As equipment and labor costs continue to soar, a trend toward more-detailed ac-

Let Rotor Lift Help You GEAR UP In...'59 For BETTER PRODUCTION

Chemical processors must increase production efficiency to capitalize on the rapid expansion in the U.S. economy expected during the early 1960s. ROTOR LIFT elevating and conveying is the answer.

ROTOR LIFT, original and finest vertical screw elevator, handles all dry, free flowing bulk materials—

MORE SAFELY
MORE DEPENDABLY
MORE ECONOMICALLY

. . . Capacities up to 6,000 CU. FT. PER HR.

8 BASIC TYPES
4 DIAMETERS

World's Largest Manufacturer of Vertical Helicoid Screw Elevators

Write for ENGINEERING CATALOG

SOUTHWESTERN SUPPLY and MACHINE WORKS

OKLAHOMA CITY, OKLAHOMA

Check 1573 opposite last page

counting of handling costs will become more important.

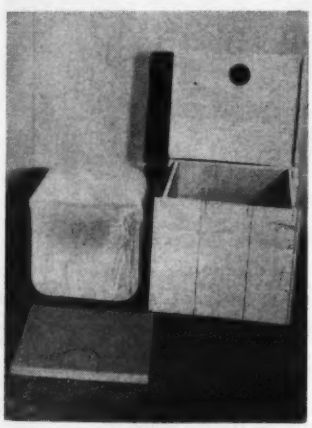
How fast will these and future trends be developed? This will depend on management's continued interest in material handling and the ability of the engineer assigned the job. The same motivating forces will be existent — and in addition there will be, and are, the factors of rising costs and increased competition.

Ease dispensing from 15-gal one-trip containers

Uses: Single-trip shipment of regulated and non-regulated liquid materials.

Features: Newly developed plug-cap simplifies emptying of contents.

Description: The 15-gal Cubitainer® consists of a semi-rigid cube-shaped polyethylene insert and outer carton



Cube-shaped polyethylene insert fits into wirebound box

of fiberboard, corrugated, or wirebound-box construction.

Plug-cap fits securely into 1½"-diam opening in insert. Removal of cap turns lip of container outward to form pouring spout. Controlled dispensing of contents is possible by snipping top off a molded nipple in cap and connecting it with hose.

(Fifteen-gal Cubitainer is development of Hedwin Corporation, 1600 Roland Heights Ave., Baltimore 11, Md.)

Check 1574 opposite last page.

"NATIONAL" PERFORATED APRON CONVEYOR DRYER

Evidence of the outstanding efficiency and economy of this "National" drying unit is found in the number of existing and on-order installations among the Nation's leading chemical manufacturers.

Increased drying capacity per square foot of surface; improved uniformity of dried product; much easier apron cleaning; greater efficiency and accessibility of gas or steam heaters; and a generally neater machine to operate and maintain, are characteristics of this drying system resulting from unique and exclusive features of "National" design, construction, operation and control.

The same type of dryer is used by the Nation's leading manufacturers of synthetic fibres.

The following well-known companies are among the current users of "National" Perforated Apron Conveyor Dryers:

AMERICAN VISCOSE CORPORATION
ARMOUR & COMPANY
THE PHILIP CAREY MANUFACTURING CO.
DAVISON CHEMICAL COMPANY, DIV. OF W. R. GRACE & CO.
DU PONT COMPANY OF CANADA (1956) LTD.
E. I. du PONT de NEMOURS & CO.
THE GENERAL TIRE & RUBBER CO.
CONGOLEUM-NAIRN, INC.
O. M. SCOTT & SONS CO.
A. E. STALEY MANUFACTURING CO.
AMERICAN ENKA CORP.
NATIONAL ANILINE DIVISION, ALLIED CHEMICAL & DYE CORP.
NATIONAL METAL EDGE BOX CO.
CANADIAN INDUSTRIES, LTD.
RADIO CORPORATION OF AMERICA
THE DOW CHEMICAL CORP.
CHEMSTRAND CORP.
UNION CARBIDE & CARBON CORP.

Write for Literature Describing These "National" Dryers and Typical Installations.

THE NATIONAL DRYING MACHINERY COMPANY
LEHIGH AVE. and HANCOCK ST., PHILADELPHIA 33, PA.

New England Agent: JONES & HUNT, INC., Gloucester, Mass. Cable Address: "NADRYMA"—W.U. Code

Check 1575 opposite last page

PUZZLED about MAGNETIC MATERIALS

ERIEZ

uses all of them!

Confused by conflicting reports concerning new magnetic materials appearing on the market? *Here's the true, impartial story:* while many of them have excellent characteristics, most of them are particularly suitable for specific jobs. It is the performance of the finished product in your specific application under all conditions that is important.

Eriez, as pioneer and world's largest producer of magnetic equipment for industry, manufactures equipment which utilizes the *best magnetic power source for your specific requirements* – at the most sensible cost to you. We do not make magnetic materials, nor are we obligated to use any special types. For that reason, we make our equipment with a variety of magnetic materials families including Alnico V, Ceramic V, Magnetic Rubber, and others. Each of these materials has certain advantages and disadvantages; we point them out when making recommendations for *your* particular needs. As new materials are thoroughly tested and proved efficient, we incorporate them into our equipment.

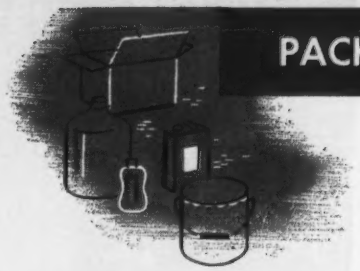
Whether you need a magnetic unit for tramp iron separation, microscopic fine iron separation, steel handling or conveying, or a Vibratory feeding application – Eriez has it. And because our magnetic equipment employs all types of magnetic materials, Eriez can give you the unit that will do your job *best!*

Eriez Mfg. Co., 73SB Magnet Dr., Erie, Pa.

WRITE FOR BIG COMPREHENSIVE FACT FILE OF MAGNETIC SEPARATION AND VIBRATION EQUIPMENT

ERIEZ

Check 1576 opposite last page



PACKAGE IDEAS

Latest developments in packages and their design

High stacking

. . . of containers is possible because reversible pouring spout stores inside during shipping, clinches on outside when using. Dome-style container comes in 2½-, 5-, and 40-lb fluid-grease sizes, all meeting ICC regulations.

(Hi-Stacker is made by Continental Can Company, 100 E. 42nd St., New York 17, N. Y.)

Check 1577 opposite last page.

Flush, weld-type seal

. . . on heavy-duty polyethylene bag in foreground is said to have virtually the same strength as the film itself. Such a seal also provides more usable bag volume and eliminates dust-catching lips of the conventional skirt-type seal shown in background.

Industrial bags with this welded seal are available open-mouth with bottom sealed, or with top and bottom sealed and miter-cut for valve-type filling machines. They can be closed with regular sealing equipment. Under development is sealing equipment to produce the flush, welded seal on the filling line.

(Chipp-a-Weld bags are development of Chippewa Plastics, Inc., Chippewa Falls, Wisconsin.)

Check 1578 opposite last page.

High stacking strength

. . . and assurance that polyethylene bag inside won't be pinched or torn are provided by container of 175-lb-test corrugated board. It's now in use for shipping bagged fertilizer by Summers Fertilizer Co., Inc., McKeesport, Pa.

Box has two full-telescopic parts. Two of the bottom flaps meet off-center. Another flap is equal in length to sides of box, and fourth has short tab.

In setting up, full flap is folded parallel inside box, off-center flaps are folded in, remaining flap is folded over, and tab tucked in. Then the full-length flap is folded down to form a solid, smooth bottom for plastic bag. Top portion is set up similarly.

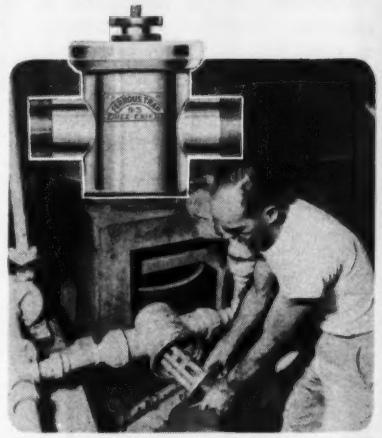
(Kapco fertilizer box was developed by Gaylord Container Corporation, Division of Crown Zellerbach Corporation, 111 N. Fourth St., St. Louis 2, Mo.)

Check 1579 opposite last page.

ELIMINATE TRAMP IRON in liquid pipelines

ERIEZ

permanent non-electric magnetic FERROUS TRAPS



ULTIMATE PROTECTION against fine iron and tramp iron contamination for most liquid-handling pipelines. Ideal for installation in food, chemical and ceramic applications. Protect product purity. Increase production. Prevent abrasive wear; reduce damage to filters, mixers, pumps, etc. Made with strong, one-piece cast bodies, Ferrous Traps withstand pressures up to 150 psi. Provide greater magnetic area than all previous models. Effective with materials up to 750°F. Quickly pay for themselves. Two types: standard stainless steel models and highly polished sanitary models.

MAGNETIC STRENGTH IS GUARANTEED FOR LIFE • QUICKLY, EASILY INSTALLED IN ANY POSITION • CLEAN, SIMPLE DESIGN HAS NO MOVING PARTS • MAGNETIC ELEMENT LIFTS OUT IN SECONDS FOR INSPECTION OR CLEANING • ADAPTABLE FOR LINES FROM ½" to 4".

Free literature has complete installation and application information. Write today to:
Eriez Mfg. Co., 73-SA Magnet Dr., Erie, Pa.

ERIEZ

Check 1580 opposite last page

THAT'S INTERESTING

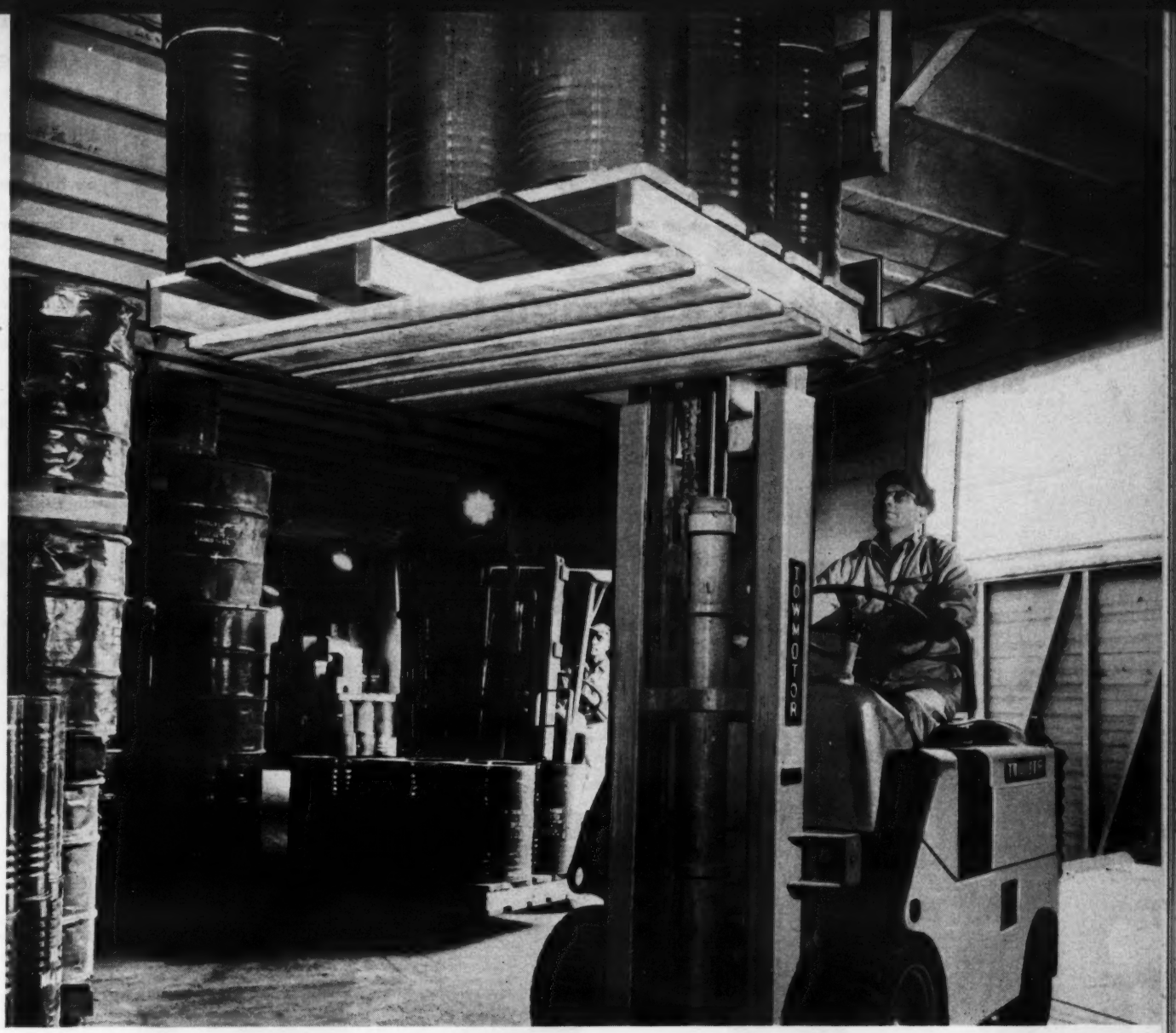
Coming into its own

Industrial material handling courses are now being taught by over 200 professors in colleges, universities, and extension schools, according to *The Material Handling Institute, Inc.*, Pittsburgh, Pa.

Space batteries

Small, compact power packs helped shoot into orbit the first weather observation satellite now circling earth. Called "Silvercels," the tiny, powerful silver-zinc batteries provided the electric power for telemetering and flight and guidance controls in the first and second stages of the three-stage, 72-ft Vanguard rocket. Silvercels, made by *Yardney Electric Corp.*, New York City, are one-sixth the weight and one-fifth the size of ordinary batteries.

For more information on product at right, specify 1581 see information request blank opposite last page.



Making fork-lift history!

Certified Job Studies continue to report new records of productivity and profit with Towmotor Fork Lift Trucks at work throughout industry. These reports by users show Towmotor handling great varieties of loads in factories, mills, yards, docks and warehouses. Unloading raw materials. Feeding production lines. Storing goods. Preventing platform tie-ups. Loading boxcars and trailers. Saving record amounts of time, space, effort and handling dollars in every industry . . . including *yours*.

These comparative statistics are readily available to you. Ask for *Certified Job Studies* applying to your own business—and *Pace-Maker Booklet SP-23* describing new Towmotor Fork Lift Trucks. Write Towmotor Corporation, Cleveland 10, Ohio.

COME SEE US AT . . . THE MATERIAL HANDLING INSTITUTE'S EXPOSITION
CLEVELAND AUDITORIUM — JUNE 9-12 1959
BOOTHS 1302-1307-1404

TOWMOTOR — THE ONE-MAN-GANG ®

-GERLINGER — LEADERS FOR 40 YEARS IN BUILDING FORK LIFT TRUCKS, CARRIERS AND TRACTORS

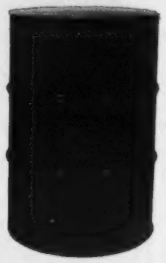
Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

VULCAN®

on everybody's mind!

Vulcan's complete line

and fast delivery of steel containers



55 GALLON DRUMS

1 TO 12 GALLON PAILS

Over 40 years Container Experience

VULCAN

CONTAINERS INC.

Write Dept. CP 59
Bellwood, Illinois
(Chicago Suburb)
Phone Linden 4-5000
Chicago phone:
MAnsfield 6-7660
In Canada:
Vulcan Containers Ltd.
Toronto 15, Canada
New Westminster
(Vancouver), B.C.
Representatives in all
principal cities
See "Pails" in the
Yellow Pages

Check 1582 opposite last page

Kiln car, mold breakage are both lowered by hydraulics

Convenient manual loading of unbaked molds

Problem: Manual loading of unbaked abrasive grinding wheels, in spaced horizontal layers atop one another on kiln cars, was an extremely awkward operation for upper layers at two leading abrasive-grinding-wheel manufacturers.

Unbaked wheels are soft mud-like packs which can crumble into sand at the slightest jar. They are loaded by two to four men on kiln trucks in layers, spaced so as to avoid contact with each other. Kiln cars run on rail tracks to transfer molds from presses to baking ovens.

Workmen place mold of large abrasive grinding wheel to begin fifth layer on kiln car which has been lowered into floor pit on hydraulic-lift platform. After loading is completed, platform is raised to track level and car is ready to be wheeled into furnace

One attempted resolution of the problem involved placement of a long bench on each side of the kiln car. Members of work team would side-step up on end of benches and inch along until a spot to place mold was found.

In addition to being slow, this method resulted in frequent stumbles. This caused injuries to men and excessive breakage of molds.

Solution: In each plant, a checkered-steel lift platform, inset with rail tracks, was installed at kiln-car loading point on track.

After each layer has been loaded on kiln car, platform is

retracted into floor pit by the distance necessary to maintain a convenient loading level. When loading of car has been completed, platform is raised to track level. Kiln car is then ready to be wheeled on track into baking oven.

Lift is operated by means of oil-hydraulic power cylinder and oil-pump unit. Unit is controlled by pushbutton from station convenient to loading operation.

Results: Kiln cars can now be conveniently loaded with four, five, and six layers of wheel molds. Breakage of molds and injuries to workmen have been reduced. This results in a more economical operation.

(Platform Oilift is product of Industrial Division, Globe Hoist Company, E. Mermaid Lane at Queen St., Philadelphia 18, Pa.)

Check 1583 opposite last page.

Feeder is AC operated without rectifier

Uses: Automatic constant-volume feeding of bulk materials. Adaptable to spreading, drying, or agitating. Also for handling materials that are hot or are being moved into high-temperature areas.

Features: Vibratory feeder operates direct from AC without use of rectifier.

Description: Unit is rated at 50 hp. Drive system is completely enclosed. Feeder incorporates epoxy-boned glass-fiber spring system.

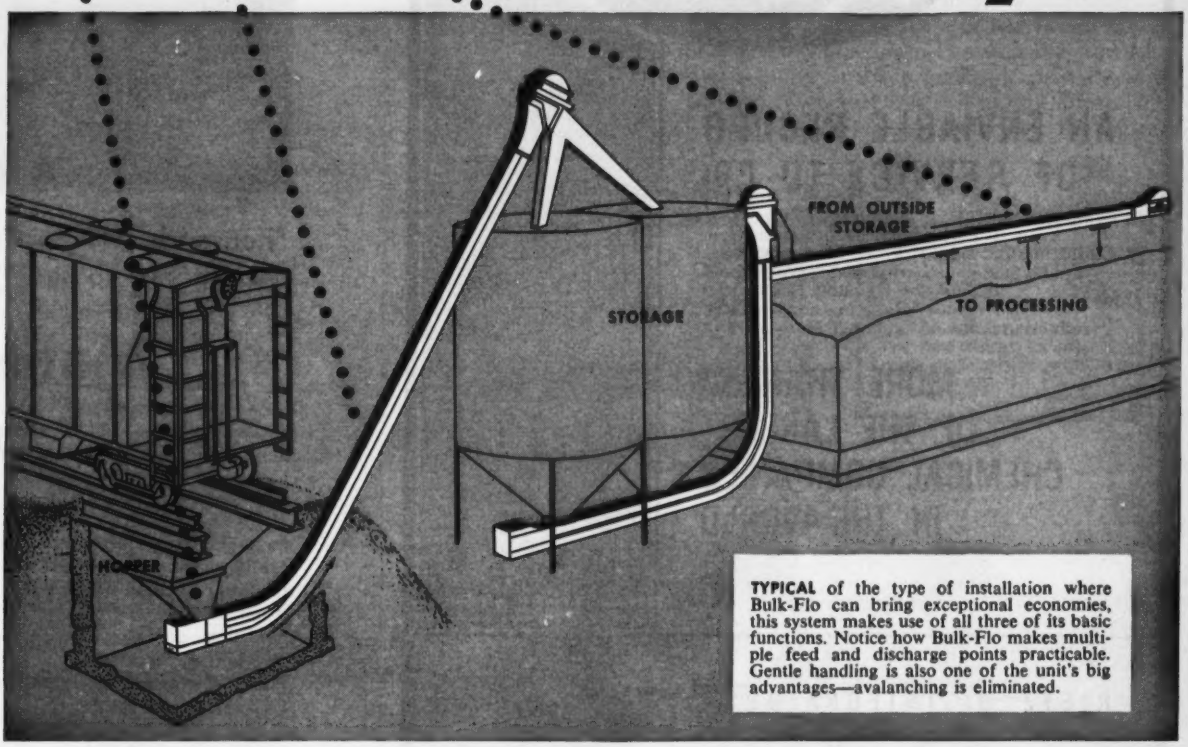
Simple variable auto-transformer control is furnished to adjust line voltage to permit quick and accurate adjustment of optimum feed rate for any given material.

Standard trays are available as follows: Flat trays, 18 X 42″ and 12 X 60″; tubular trays, 12 X 36″ and 8 X 60″. Trays are of all-welded construction and are available in either mild or stainless steel.

(Model V3B-70A HI-VI feeder is product of Eriez Manufacturing Company, Erie 6, Pennsylvania.)

Check 1584 opposite last page.

It's a feeder! It's an elevator! It's a conveyor!

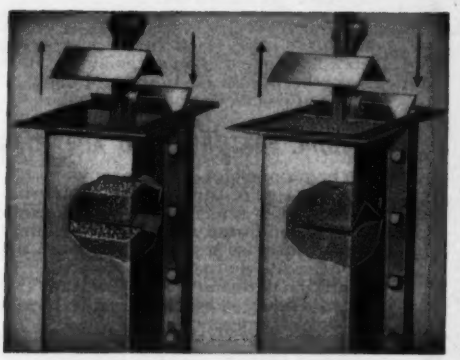


TYPICAL of the type of installation where Bulk-Flo can bring exceptional economies, this system makes use of all three of its basic functions. Notice how Bulk-Flo makes multiple feed and discharge points practicable. Gentle handling is also one of the unit's big advantages—avalanching is eliminated.

It's 3 units in 1! And LINK-BELT Bulk-Flo works equally well fully or partially loaded

With its remarkable ability to combine horizontal, vertical and inclined travel . . . to feed, convey and elevate using a single drive—Link-Belt Bulk-Flo is industry's most versatile medium for handling non-abrasive, non-corrosive materials. In fact, it often replaces several units—in less space and at lower cost.

Bulk-Flo will bring you the tremendous savings it has brought to so many other plants. Let a representative at your nearest Link-Belt office give you an unbiased answer. Or write for Book 2475.



SOLID FLIGHTS permit Bulk-Flo to operate independently of internal pressure. Thus, it needn't be loaded to full capacity in order to provide positive movement of material. Speed is constant—capacity can be varied by merely regulating amount of feed. And regardless of load, Bulk-Flo is self-clearing.

LINK-BELT

BULK-FLO FEEDERS • CONVEYORS • ELEVATORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.681

Check 1585 opposite last page

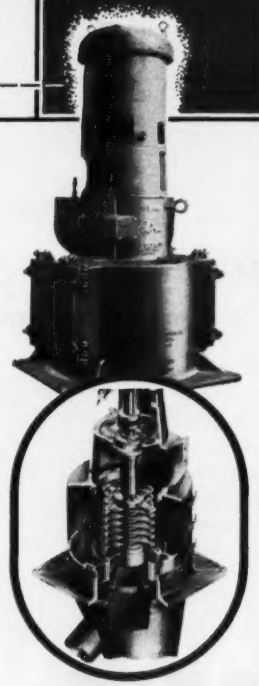
Rietz

AN ENVIABLE RECORD OF SERVICE TO CPI

From its major facilities in Santa Rosa, California and West Chester, Pennsylvania – and its field engineering and service offices in Chicago, Houston, Seattle and Los Angeles – Rietz has supplied size reduction and heat exchange equipment to

MORE THAN 50 OF THE LARGEST CHEMICAL COMPANIES IN THE WORLD

An example



RIETZ DISINTEGRATORS

TYPICAL APPLICATIONS

Dry pulverizing – coarse or fine. Wet grinding of solids to produce slurries or pastes. Fine dispersion and homogenizing. Dissolving of solids in liquids. Intimate mixing of pastes, slurries and powders.

SPECIAL FEATURES AND ADVANTAGES

Can be supplied for operating under atmospheric pressure, vacuum or internal pressure. 360° screen area insures maximum capacity, uniformity of grind and minimum temperature rise of product. Optional secondary discharge for continuous separation of disintegration-resistant material. Rugged, compact construction in carbon or stainless steel in vertical design (as illustrated), or in angle or inverted models.

Rietz MANUFACTURING CO.
Santa Rosa, Calif. • West Chester, Penna.
DISINTEGRATORS • PREBREAKERS • EXTRUCTORS • THERMASCREWS

Check 1586 opposite last page

Thousands will flock to Cleveland next month to see . . . . .

Material handling put best foot

Three years of practical engineering achievement, liberally seasoned with advanced thinking geared to trigger a breakthrough in material-handling costs, will be fare offered up to visitors at The Material Handling Institute's Exposition of 1959.

The exposition, to be held at Cleveland Public Auditorium, Cleveland, Ohio, June 9 through June 12, will feature booths of more than 200 exhibitors and include technical sessions sponsored by American Material Handling Society, Inc.

Show is expected to draw 30,000 or more. Admission will be free, but open only to registered individuals. (Preregistration is advisable to avoid waiting in line at auditorium.) Last exposition, held in 1956 in same location, drew 26,381 registered guests.

Strong overseas interest has been indicated. Tentative arrangements have been made to assemble industrial buyers in several foreign areas for trips to U.S. in June. In anticipation of this eventuality, arrangements have been made for interpreters.

Various exhibits will occupy nearly 200,000 sq ft of floor space. Some displays will be of outdoor type. Many new pieces of equipment will be displayed for first time. Since this is first show of its type since 1956, a great many innovations are anticipated.

Among types of equipment to be displayed are industrial trucks of all kinds, plus associated equipment; batteries and battery-charging equipment; conveyors of all types; hoists; hydraulic systems and components; containers; marking equipment.

Also: cranes; pallets and skids; elevators and lift tables; power-transmission products; racks; two-way radio and TV units; dockboards; scales; strapping and unit loads.

Technical Sessions

Three-hour "education sessions" (requiring a registration fee) will be held in the mornings of June 9-11. This phase is sponsored by American Material Handling Society, Inc. with endorsement of Society for Advancement of Management and of the Material Handling Division, American Society of Mechanical Engineers. AMHS annual banquet will be Thursday evening.

suppliers forward

Management

. . . session will be held on Tuesday morning and is sponsored by SAM.

Chairmen: Warren King, SAM national vice-president for material handling and Roy W. Rix, Senior Consultant, Cost and Methods Dept., Cleveland Electric Illuminating Co.

Speaker: Fred E. Harrell, General Manager, Marquette Division, Curtiss Wright Corp., and SAM national treasurer — "How to Sell Me on Material Handling."

Panel: Charles A. Thomas, Assistant Secretary, Standard Pressed Steel Corp. — "The Type of Individual Best Suited to Carry Our Material Handling and Packaging Activities."

Jonathan L. Collens, Manager, Large Motor Division, Reliance Electric Engineering Co. — "What Should the Material Handling Man Know About Business Economics?"

Roland W. Puder, Group Supervisor, Engineering Department, E. I. du Pont de Nemours & Co. — "How Do You Pay for New Equipment . . . Lease, Rent, or Purchase?"

Engineering

. . . is topic of discussion to be held Wednesday morning and arranged by ASME Material Handling Division.

Chairman: A. T. Gaudreau, Gaud-Reau Associates.

Panel: M. A. Michel, Assistant Chief Engineer, Pittsburgh & Lake Erie Railroad — "Mechanized Freight Handling at Railroad Terminals."

Forrest Weldon, Director of Research, Matson Navigation Co. — "Some System Considerations in Containerizing Ships' Cargoes."

Chairman: Professor Byron Saunders, College of Engineering, Cornell University.

Panel: John Moskowitz, Engineer in Charge of Material Handling, and William O'Grady, Project Engineer on Power Plant Construction, Philadelphia Electric Co. — "Coal Handling Facilities at a Power Generating Station."

George E. Waldron, Production Manager, Carling Brewery Co. — "An Engineered Case Handling System in a Modernized Brewery."

Applications, techniques

. . . panel will be supervised by AMHS Thursday morning.

Chairmen: Joseph F. Carle, President, Lincoln Extension Institute and Ralph Reiner, Production Manager, concrete products, Cleveland Builders Supply Co.

Speaker: Norman Shaffer, Material Handling Engineer, Western Electric Co. — "How to Get Personnel to Accept New Ideas in Material Handling."

Panel: Myron Miller, Supervisor of Safety, East Pittsburgh Works, Westinghouse Electric Corp., and Regional Vice-President, American Society of Safety Engineers — "Safety Training for Material Handling Personnel."

Jack Vander Molen, Crane Company — "How Can Material Handling Solve Production Problems?"

Thomas Wharton, Containers Laboratories, Inc. — "What the Material Handling Engineer Should Know About Packaging."

BE ON THE SAFE SIDE . . .
and cut handling cost doing it

WITH ALLIS-CHALMERS LIFT TRUCKS

Allis-Chalmers lift trucks are built to *produce* and *protect*. Ask any user about their performance . . . how they out-maneuver . . . how you can count on them for long life with low maintenance.

Then check on the many ways they protect men and equipment. Note their sure-footed stability on steep grades . . . strength from frame to mast . . . freedom from obstructions in the operator's compartment . . . location of the fuel tank — away from the engine.

FOR HAZARDOUS AREAS PLAY IT REAL SAFE WITH SPECIAL SAFETY TRUCKS

Allis-Chalmers GS (gasoline safety), LPS (LP gas safety) and DS (diesel safety) Trucks bear the Underwriters' Laboratories inspection seal for working in areas where there are flammable liquids or gases, combustible dusts or ignitible fibers.

Accepted by MILL MUTUAL FIRE PREVENTION BUREAU

Allis-Chalmers DX Safety Diesel Lift Trucks were developed to provide exceptional protection against explosions. The starter is hydraulic, gauges are mechanical, water manifold and muffler reduce temperature of usually-hot surfaces and quench exhaust sparks.

No matter what the job, your Allis-Chalmers material handling dealer can show you how you can have the best in both production and protection. Allis-Chalmers, Milwaukee 1, Wisconsin.

See Allis-Chalmers lift trucks at the Material Handling Show Cleveland, June 9-12

ALLIS-CHALMERS

BH-87

Check 1587 opposite last page

Each dominates its field—
With "the teeth that make the big difference"

In high speed dispersing with the Cowles Dissolver, those "teeth" mean greater volume, higher quality, complete control—in less space and at lower cost. It's because the unique teeth of the patented Cowles Impeller give the most effective mixing action yet developed. And Cowles scientifically engineered power and drive systems assure you of maximum horsepower delivery—with operational ease at all impeller speeds.

Cowles' exclusive "Multi-Phase" mixing action makes it most in demand for ultimate dispersion, dissolving, emulsifying and deagglomerating in processing solid-liquid, liquid-liquid and gas-liquid materials. Even viscosities in excess of 50,000 centipoises are easily handled by the Cowles. There is no surge, no splash. Easy to clean, too, and the self-cleaning impeller won't clog—you'll save on operator time.

Cowles engineers will be happy to work with you in adapting the Cowles to your materials, processes and present equipment. They can help solve your processing problems economically.

Let us prove it in your plant—at our risk.

SEE HOW THE COWLES IS SOLVING THESE PROBLEMS:
(Cases from Cowles APPLICATIONS ENGINEERING files)

Vinyl Solutions in ½ the time
(1-G) *A special, patented Cowles Impeller is reducing per-batch time to only 2 hours. Previous methods required 4 hours. For many materials the Cowles can multiply volume up to 2-½ times.*

In-place Rug Padding Is New!
(1-H) *Amazing results in production of the revolutionary new foamed in-place rug padding compounds are reported for the Cowles. In a single operation, many dry materials are dispersed to ultimate particle size, let down to finished rug backing and pumped directly to tank trucks for delivery to rug manufacturers. (They foam the compound directly onto regular rug backing, thus eliminating the old separate pad). With the Cowles, one plant is now set for 200,000 gallons per month! Here's a great example of Cowles versatility in taking over on new problems.*

Blunging Clay Body Speeded 1250%
(1-J) *In a dinnerware plant, 500 gallon batches are now blunged via Cowles in ¾ hrs. Operation used to take 6 hours. And the Cowles in combination with the Morehouse Mill completes job of both blunging and milling in 1 hr. vs. old method with ball mill that previously took 8-24 hrs.*

Starch Cooking Simplified
(1-K) *The Cowles acts as a completely self-contained homogenizing unit to produce finished batches of starch in an amazingly short time. 20 minutes for small batches, 1 hour for 250 gals., 2 hours for 2000 gals. are routine times. Report says no maintenance problems, no expensive repair parts, small power consumption.*

Teflon Dispersions High as 90%
(1-L) *In the plastics industries the Cowles is regularly handling teflon dispersions in concentrates as high as 80-90%. Batches are completed in 45 min. Again, speed and thoroughness hand in hand.*

Write today for complete information and catalog.

MOREHOUSE COWLES

MOREHOUSE-COWLES, INC., 1150 San Fernando Road, Los Angeles 65, California

REPRESENTATIVES IN PRINCIPAL CITIES • CONVENIENT LEASE AND TIME PAYMENT PLANS

5906

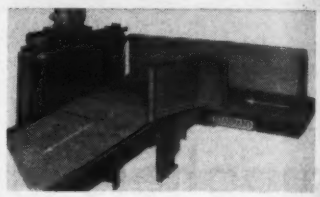
Check 1588 opposite last page

Separate belt drives cut diverter upkeep

Uses: For diverting different sizes and types of containers.

Features: Belts on right-angle transfer unit have separate drives which eliminate complicated drive arrangements and costly maintenance problems.

Description: Feed and takeaway belt are set at right angles to each other. A short



Separate drives for feed, takeaway, and vertical belts cut diverter's maintenance costs

vertical belt is mounted across end at right angle to feed belt and parallel to takeaway belt. Vertical belt assists in turning material and completing transfer.

(Air Service Diverter is development of Standard Conveyor Co., North St. Paul 9, Minnesota.)

Check 1589 opposite last page.

Automatic bag closer starts and stops instantaneously

Uses: Automatic sewing shut of paper bags.

Features: Both conveyor belt and sewing machine have instantaneous start/stop controls: no lagging starts or coasting stops.

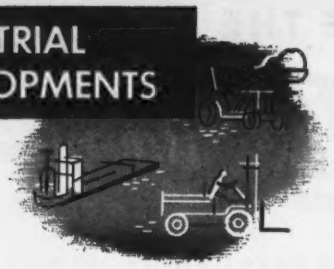
Description: Bags themselves start sewing operation when they reach sewing head. After sewing is done, thread is cut automatically and sewing action stops as conveyor belt continues to move bag.

Easy-to-install unit closes bags at a rate of 30 feet per minute.

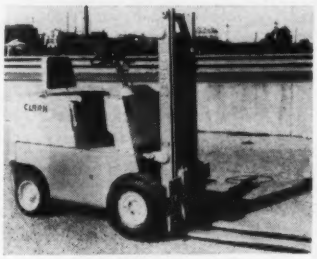
(Series BA bag closer is product of Dave Fischbein Company, 2730 30th Ave., South, Minneapolis 6, Minn.)

Check 1590 opposite last page.

LATEST INDUSTRIAL TRUCK DEVELOPMENTS



. . . in design, capacity, operating features, and accessories for improved performance and safety

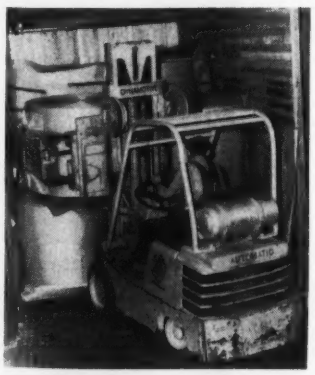


Indoors or outdoors

. . . 2000-lb fork truck does its work with dispatch. Combination of pneumatic drive tires and cushion steer tires provides traction for negotiating rough surfaces or ramps and for easy steering on smooth floors. Turning radius is 64", top forward and reverse speed is eight mph. Truck will climb 25% grade with full load.

(C-20-B Special fork truck is product of Industrial Truck Division, Clark Equipment Company, Battle Creek, Mich.)

Check 1591 opposite last page.

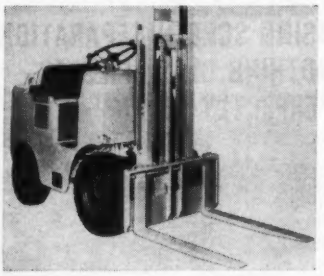


Jiffy unloading . . .

. . . of paper is done by gas-powered electric-driven lift truck which handles 50,000-lb carload shipment in hour. Truck has lifting capacity of 6000 lb, handles about 720 tons of paper monthly at International Paper Company's multiwall bag plant, San Jose, Calif. It moves one roll of paper from storage to printing machine 200 feet away, then transports three rolls to tuber machine. After bags are printed, tubed, sewn, and automatically placed on skids, another lift truck of lighter capacity loads pallets onto freight cars and trucks.

(Dynamotive Models GLF-60 and GLF-40 lift trucks are manufactured by Automatic Transportation Company, Div. of the Yale and Towne Manufacturing Company, 101 West 87th St., Chicago 20, Ill.)

Check 1592 opposite last page.



Hydraulic starting motor

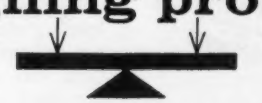
. . . replaces conventional electric motor, generator, and storage battery on this diesel fork-lift truck. In fact, the whole truck is completely devoid of electrical components, making it safe for many hazardous locations. Low-volatile fuel is used. Truck has water-cooled exhaust manifold and water muffler.

Unit is available in nine models — with lifting capacities from 3000 to 12,000 lb.

(Safeguard diesel fork-lift trucks are made by Towmotor Corporation, 1226 E. 152nd St., Cleveland 10, Ohio.)

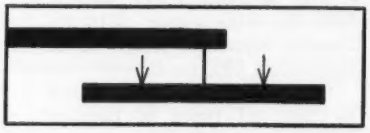
Check 1593 opposite last page.

How did this team solve an age-old weighing problem?



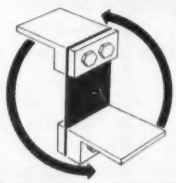
Since 5,000 B.C. men have been trying to devise a pivot balance that would be highly sensistive yet remain accurate. The breakthrough came in 1956 when the United States issued a patent for a "Thayer Flexure Plate" Leverage System. A team of engineers and businessmen, aware of industrys great cumulative loss of materials in weighing operations, had invented a revolutionary new scale.

Knife-edged pivots that progressively wear and change were replaced by Thayer Flexure Plates that move only .001", yet accurately reflect the minutest changes in weight. This *firmly joined* lever withstands shocks and vibrations indefinitely. Dirt and dust are no longer a problem. Thayer guarantees this leverage system accurate for the life of the scale.



How Can It Save You Money Year After Year?

Working in conjunction with straight electrical controls, it forms the most reliable, low maintenance system ever devised to control processing or materials handling *by weight*. Literature on its application to filling, batching and checkweighing operations is available on request.



THAYER SCALE

AUTOWEIGHTION SYSTEMS FOR FILLING, BATCHING AND CHECKWEIGHING

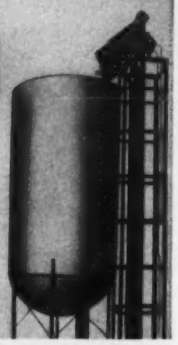
THAYER SCALE CORP. • 6 THAYER PARK, PEMBROKE, MASS.

Check 1594 opposite last page

MAKE DUMPING A
PUSHOVER!
AND CUT HANDLING COSTS

Looking for a safe, economical way to lift and dump any free-flowing material in one operation? Now you can easily handle all bulk material . . . in solid or powder form, and in any type of container, such as drums, boxes, barrels and even bags . . . with these material handling "power-houses."
All dumpers are flexible in design so they may be fitted to meet exactly with customers' specifications. Many built-in safety features are employed throughout to insure long hours of maintenance-free operation.

FOR THOSE REALLY HIGH DUMPING JOBS

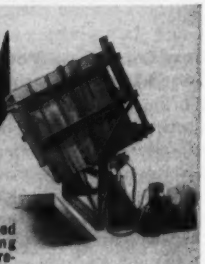


ESSEX
VERTICAL DUMPER
In one smooth operation this equipment can lift containers to any practical height, dump the contents and return the container to load position.

FOR THOSE INTERMEDIATE DUMPING JOBS

ESSEX
MULTI-PURPOSE DUMPER
For dumping heights of up to 20 feet, with 3000 pound capacity. Can be permanent or mobile. Also hand and electric powered junior models available.

FOR THOSE FLOOR-LEVEL DUMPING JOBS



ESSEX
HYDRO-DUMPER
A hydraulically-operated dumper for dumping where no lifting is required. Mobile or stationary models available. Both will lift up to 3 tons.

ENGINEERED MATERIAL HANDLING

Write for FREE catalog —
ESSEX
CONVEYORS, INC.
Dept. CP, 165 Franklin Ave., Nutley 10, N. J.

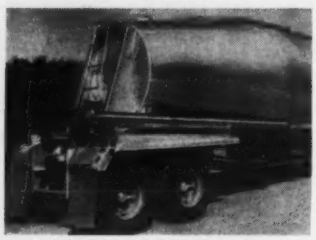
Check 1595 opposite last page

HANDLING & PACKAGING

Aluminum, steel trailers designed for high-speed bulk-material unloading

One is equipped with auger, other has twin screws

A hopper-bottom aluminum dry bulk trailer and a dry bulk transport which features steel construction and twin-screw unloading have been developed recently.



Swivel-mounted auger on hopper-bottom aluminum dry bulk trailer is optional equipment. Trailer without auger is standard gravity-dump model

The aluminum vehicle is designed to haul lighter weight materials such as fertilizer, plastic pellets, salt, and alum.

It is available in two unloading models. One is a center-unloading gravity-dump type; the other has a swivel-mounted auger that discharges to rear or either side. Large manholes (30 x 72") make loading fast and easy.

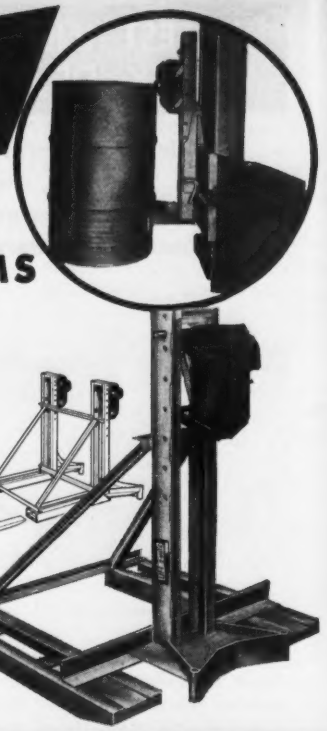
Two slide-gate outlets, each 24 x 42", make unloading possible at maximum rates. Cams activate unloading gates, which require only one-half turn from closed to open position. Hopper slope of 45° minimizes material hang-up and assures clean emptying.

Unit without auger weighs 8680 lb; with auger, 9510 lb. Hopper capacities range up to more than 1000 cu ft.

Steel transport is designed to haul all types of heavier bulk material (such as cement and fly ash). Heavy-duty construction makes for longer trailer life.

"Clean bore" interior of 60°-slope side walls assures positive flow to twin screws and permits fast, continuous unloading without material hang-up or bridging. Manufacturer estimates one or more

USE THE
POWER TRUCK ATTACHMENT
LIFT-O-MATIC
for
HANDLING DRUMS
with a
POWER
FORK TRUCK
WITH FORKS LEFT ON
OR
REMOVED

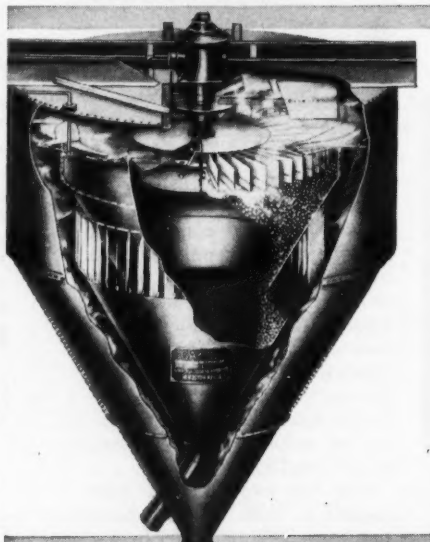


Simple, automatic, mechanical handling of any size or type of drum—single or multiple.

WRITE FOR CATALOG
MARVEL INDUSTRIES, Inc.
2234 CLEVELAND ST., EVANSTON, ILLINOIS

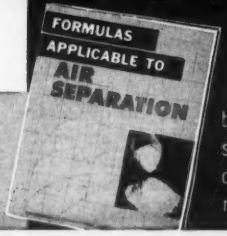
Check 1596 opposite last page

USING SCREEN SEPARATIONS?
NOTHING CLASSIFIES AS PERFECTLY AS AIR



GAYCO
CENTRIFUGAL AIR SEPARATORS
Classify practically all dry fine materials
You get
- CLOSER SEPARATIONS
- IMPROVED PRODUCTION
- NO UNDESIRABLE OVERSIZE.

RANGE 60 to 400 mesh.
Timken bearings.
Choice of Standard or Heavy-Duty Models.



this helpful booklet sent on request

Rubert M. Gay Division
UNIVERSAL ROAD MACHINERY CO.
117 Liberty St., New York 6, N. Y.
Factory and Laboratory: Kingston, N. Y.
In Canada: Watson-Jack Hopkins Ltd., Montreal

Check 1597 opposite last page

extra loads can be delivered per day due to time saved in unloading.

Each of the twin, dual-pitch 9″-diameter screws is 28′6″ long and has 6″ pitch the first 20′ for power unloading even though vehicle has full, tightly packed load. A 9″ pitch on rear 8′6″ length provides speed and assures maximum delivery rate.

Screws can be operated separately or in unison for selective unloading speed. Remote controls at rear of trailer are easily operated by driver.

Carrier is available in 640-, 740-, and 840-cu-ft capacities.

(Hopper-bottom aluminum dry bulk trailer and twin-screw-unloading dry bulk steel transport are developments of Butler Manufacturing Company, 7400 East 13th St., Kansas City 26, Mo.)

Check 1598 opposite last page.

Automatic switching of dragline carts

Pressure-sensitive bumpers on dragline carts provide for automatic switching and more safety on tow-line systems. Mechanisms provide for non-manual switching from one line to another, dispatching from one position to another, stopping and/or accumulation of trucks on moving tow-line conveyor, automatic engagement of truck to line.

(Dragline carts with pressure-sensitive bumpers are product of SI Handling Systems, Inc., PO Box 70, Easton, Pa.)

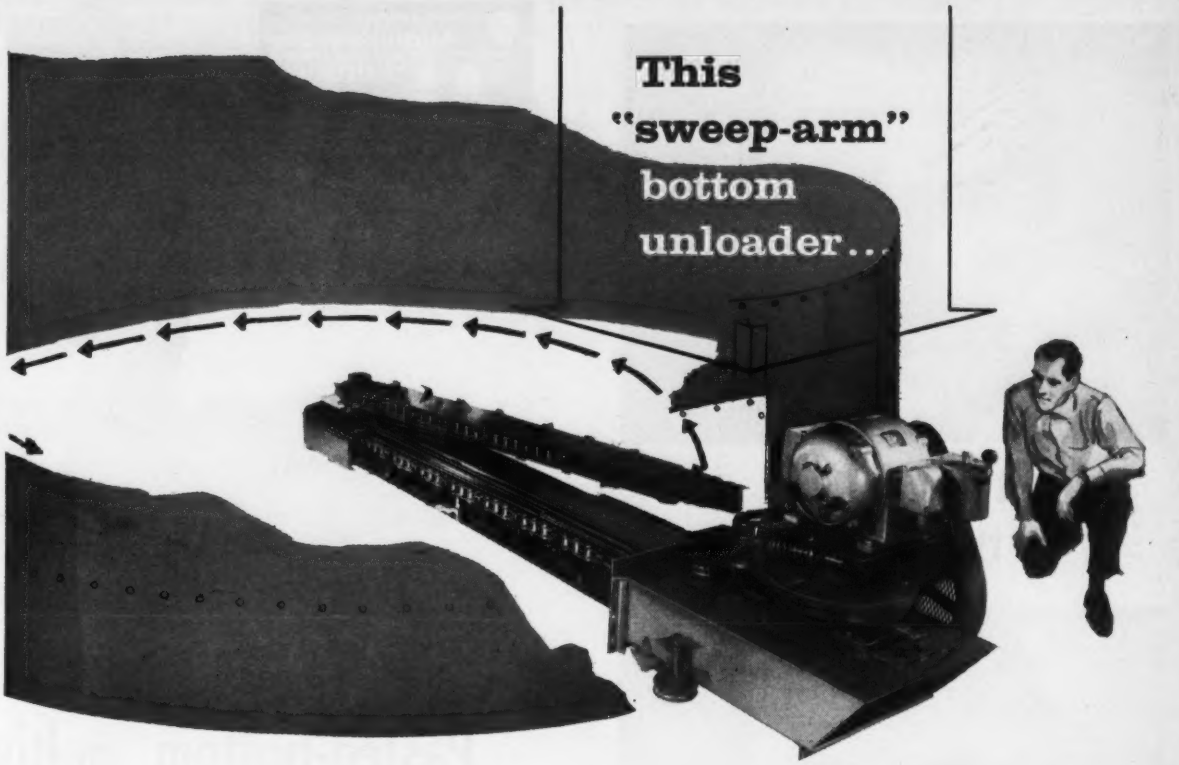
Check 1599 opposite last page.

Paper and plastic packages are fully outlined and discussed in 16-page booklet. "This is Kennedy"—Kennedy Car Liner and Bag Company, Inc., Shelbyville, Ind.

Check 1600 opposite last page.

Rotary-vane feeder valves are detailed in four-page bulletin. Close-up photos, exploded views, and engineering drawings are also contained in Bul 24-D—Sprout, Waldron & Co., Inc., Muncy, Pa.

Check 1601 opposite last page.

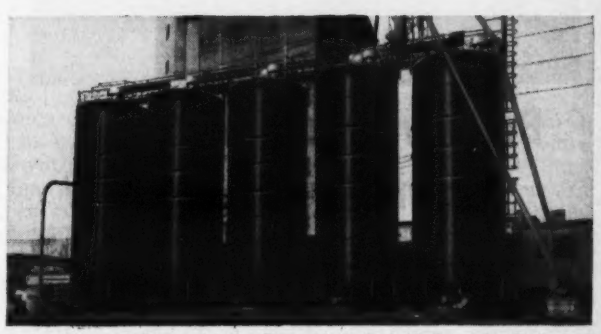


is the key to a completely mechanized materials-handling system

Exclusive with Permaglas® Mechanized Storage Units,

the mechanical sweep-arm bottom unloader provides the first *reliable* method for automatically discharging bulk materials into your conveying system, on a first in first out basis. Result: substantial labor savings – elimination of costly bags, bins, barrels, fork trucks and the expense of maintaining this equipment.

If your operation involves the storage or movement of granular, flaky or pulverized; hygroscopic, corrosive or contaminable; edible or non-edible or hard-to-handle bulk materials – it will pay you to see how Permaglas Units can mechanize the storage of these materials. For more details on these unique structures and the operation of mechanical sweep-arm bottom unloader, mail coupon below.



Modernize your bulk materials handling with A. O. Smith Permaglas Mechanized Storage Units. In the totally enclosed Permaglas Mechanized Storage Unit System shown above, incoming bulk materials are conveyed directly into the Permaglas Unit. Sweep-arm bottom unloaders discharge material into the pneumatic conveying system which delivers it to the processor's line.

Further, these unique steel structures – glass-protected inside and out* – are completely sanitary, provide contamination-free storage and require a minimum of maintenance!

*HYDRASTEEL – Process covered by U.S. Patent No. 2,754,222

Through research ... *a better way*

A.O.Smith
CORPORATION

HARVESTORE PRODUCTS
Kankakee, Illinois,
A. O. Smith INTERNATIONAL S.A., Milwaukee 1, Wis., U.S.A.

A. O. Smith Corporation, Dept. CP-59, Kankakee, Ill.

Please send me, without obligation, information on how Permaglas Mechanized Storage Units can be the *HEART* of my materials handling system.

I am particularly interested in the movement and storage of: _____

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

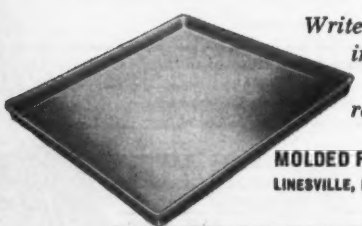
Check 1602 opposite last page

I hate trays that botch batches

But have you tried molded fiber glass?

No more leaks or spoiled batches. Toteline Molded Fiber Glass Trays don't corrode. They resist non-oxidizing acids, corrosive salts, weak alkalies, many other chemicals. They're great!

• Anti-corrosive • Won't bend, dent or splinter
• Lightweight • Clean easy • Wire-reinforced edges



Write for complete information and name of nearest representative

MOLDED FIBER GLASS TRAY CO.
LINESVILLE, PA.

TOTELINE MF-58-03

Check 1603 opposite last page

A CHEMICAL PROCESSING FEATURE
MATERIAL HANDLING & PACKAGING

Pasted-bottom multiwall bag cures resin-handling headache

Brings more-efficient use of warehouse space and labor to General Tire & Rubber Company

Problem: The Chemical Division of General Tire & Rubber Company, Ashtabula, Ohio, met a tough handling and warehousing problem when they added Vygen 161, a low-density blotter-type resin, to their line of Vygen high-density resins. They couldn't get bags of this material into their standard unitized payload of 2000 lb on their 40 x 52″ expendable pallets. Thus, more warehouse space and handling were required.

Load of low-density Vygen 161 in pasted-bottom bags is easily handled on 40 x 52" expendable pallets at General Tire

The heavier resins, packed 50 lb per bag in open-mouth sewn-bottom multiwall bags, were palletized five bags per tier, eight tiers per skid. While, by squeezing and bag flattening, it was possible to get 50 lb of the light Vygen 161 into a similarly constructed but larger bag, only four instead of five of these could be put into a tier. This gave a pallet load of only 1600 lb instead of 2000/lb.

Height of pallet load could not be raised because existing archways would have had to be altered at considerable expense. Going to a larger pallet would have complicated the problem of loading trailer trucks and rail boxcars.

Solution: General Tire then investigated the possibility of changing the style of the multiwall bag for the Vygen 161. Packaging engineers of Union Bag-Camp Paper Corporation were called in by Al Biel, company purchasing agent, to study the problem and make their suggestions.

Al Biel, General Tire's Chemical Division purchasing agent, shows the four bags mentioned in article. On right is large sewn-bottom bag used first for low-density Vygen 161. Bag second from right is pasted-bottom bag which replaced it. Third from right is sewn-bottom bag now used for high-density resins, which will eventually be replaced by experimental pasted-bottom bag at left

Top of Vygen 161 bag is sewn closed after filling. The pasted-bottom bag is handled on existing equipment

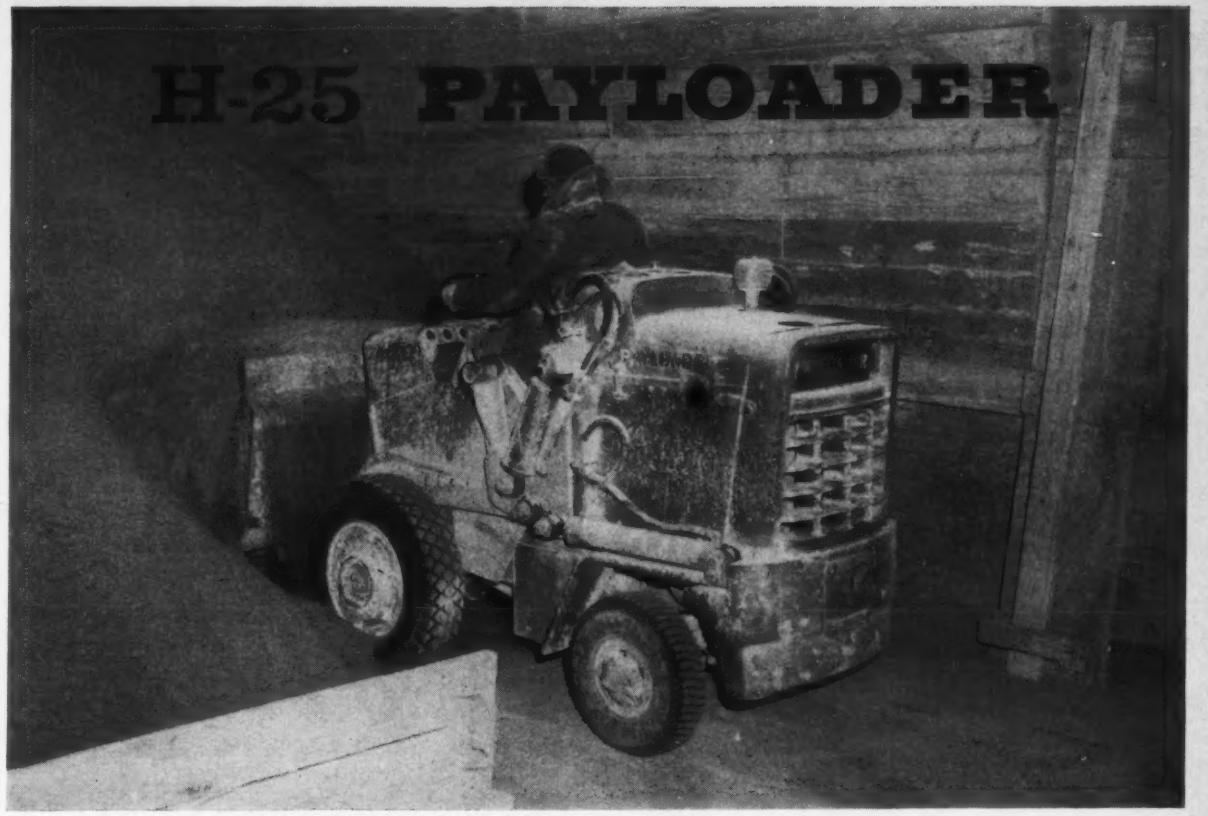
An open-mouth multiwall with a pasted bottom closure was recommended. This bag has side gussets and a rectangular bottom construction. It looks somewhat like a king-size version of a grocery sack.

The bag is filled, palletized, and loaded with the same procedures and equipment as before. Bag closure is accomplished with a bound-over sewn tape.

Results: Now General Tire can get 50 lb of the low-density resin into each bag without squeezing or flattening — can palletize to get 2000-lb payloads on the 40 x 52" expendable pallets and still fit the loads easily through existing archways.

The increased payloads have permitted better use of warehouse space. Yield of each warehouseman per month has been increased to one million pounds, despite additional duties of delivering raw materials, unloading trucks, etc.

A similar bag is now under



moves up to 50% more for Virginia-Carolina Chemical Corp.

"On the shipping work the model H-25 does the job previously handled by two model HA's — moves up to ½ as much again as each HA", says Supt. Geo. Eversman, Supt. of V-C's Ft. Wayne, Indiana plant.

"Its ability to dig in extreme hard, compacted material and carry larger loads reduces the number of machines operating in the plant and eases the traffic problem. Repairs have been minor with minor adjustments and a minimum loss of time."

Virginia-Carolina Chemical Corporation has 34 fertilizer plants serving agriculture in 32 states. It has used 'PAYLOADER' units since the first models were built by The Frank G. Hough Co., and also owns one of the largest 'PAYLOADER' fleets. This model H-25 at their Ft. Wayne operation is one of several of these new, more-productive units now serving in their various plants.

There are many reasons why the new Model H-25 will dig, carry and deliver more tonnage with lower operating and maintenance costs than anything in its class. One reason is its 2,500 lb. carry capacity — 500 lbs. more than ever before available with a machine having only 6-ft. turning radius. Greater operating ease, cycling speed and digging power are provided by power-steer, power-shift transmission (no clutching), and 4,500 lbs. of breakout force.

The Model H-25 has extraordinary protection against dust and dirt damage: precleaner and two oil-bath air cleaners; cartridge-type oil filters on the three oil systems; sealed self-adjusting hydraulic service brakes; parking brake enclosed in transmission; special oil and grease seals on all vital points.

HOUGH

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

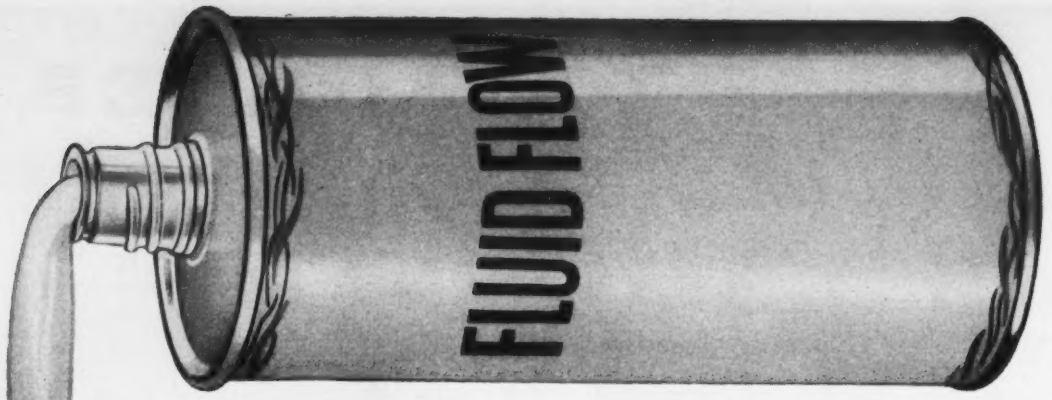
THE FRANK G. HOUGH CO.
744 Sunnyside Avenue, Libertyville, Illinois

☐ Send data on new H-25 'PAYLOADER' ☐ Other 2-wheel-drive types
☐ Larger 4-wheel-drive types

Name.....
Title.....
Company.....
Street.....
City.....State.....

5-A-1

Check 1604 opposite last page



FLUID FLOW CANS BY CONTINENTAL

BEST FOR *Polishes and Waxes*

Your waxes and polishes take on many new selling advantages when you send them to market in Continental Fluid Flow cans. Consider these features:

No drip nozzle of polyethylene for free flow and exact dripless cutoff.

Wrap around lithography: Solderless construction leaves the entire can (dome top, too) free for decoration with Continental's superb lithography.

Matchless beauty that lasts: Protected by a special varnish that prevents marring during display.

Unsurpassed product protection insured by specially developed enamel linings.

Colored nozzles to match or contrast with can design for added sales appeal.

WIDEST RANGE OF SIZES!

Continental Fluid Flow cans are available in the widest range of sizes, every size you want to satisfy your customer's needs, from 12 oz. to one-half gallon. Get the best can for your polishes and waxes, *plus* Continental research and engineering service. Call Continental today.

QUALITY Continental SERVICE

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4
Canadian Division: 5595 Pare St., Montreal, Que.

Check 1605 opposite last page

development for the high-density resins. This will add ten more 50-lb bags to the present skid, thereby increasing pallet payload from 2000 to 2500 lb and reducing warehouse space requirements still further.

(Open-mouth pasted-bottom shipping sack is a product of Union Bag-Camp Paper Corporation, 233 Broadway, New York 7, N. Y.)

Check 1606 opposite last page.

Drum handling attachment moves, tiers containers without using pallets

Uses: For engaging, transporting, placing, and tiering any conventional-type drum without using pallets or dunnage.

Features: Clamping mechanism of mechanical unit can be used on any of manufacturer's line of electric fork trucks. Mechanism is adjustable from 35" to 14". Thus any size drum, regardless of height, diameter, head, or rim size, can be handled.

Bulk storage of drums is made easier with Liftomatic drum-handling attachment. Note that foot controls free operator's hands for steering and easy maneuvering

Jaws grip solidly on steel, removable-lid, fiber, or light-gage (disposable) metal drums either open or closed. Additional controls are not necessary.

Unit is quickly detachable, with one man being able to attach it in two to three min-

utes without using tools. Unit has no nuts or bolts.

Description: Mechanism consists of an outer and inner housing. Latter is spring-actuated, and has an upper and lower jaw.

Truck operator approaches drum. Inner housing is pressed in until outer housing touches side of drum. When operator raises carriage, jaws of attachment automatically grip rim of drum, and drum is ready to be moved.

When removing drum, operator lowers drum to the resting surface and continues to lower truck carriage until both jaws have retracted.

(Liftomatic drum handling attachment is development of Dept. R8-31, Lewis-Shepard Products, Inc., 125 Walnut St., Watertown, Mass.)

Check 1607 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Water doesn't weaken corrugated box

A corrugated shipping box introduced recently stays strong and rigid even when dripping wet. It is made from corrugated board thoroughly impregnated with wax.

Boxes vary from regular corrugated containers only in color, which is slightly darker. Colored inks have been developed for printing on the broad, smooth panels.

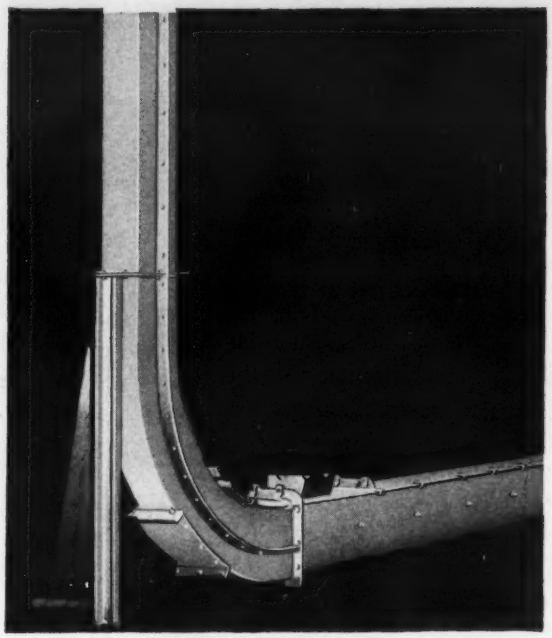
(M/R boxes are made by Hinde & Dauch Division of West Virginia Pulp and Paper Company, Sandusky, Ohio.)

Check 1608 opposite last page.

Car shaker, designed to rapidly empty hopper cars without damaging them, has electrical and mechanical data and specifications given in Data Sheet 51410—Syntron Company, 110 Lexington Ave., Homer City, Pa.

Check 1609 opposite last page.

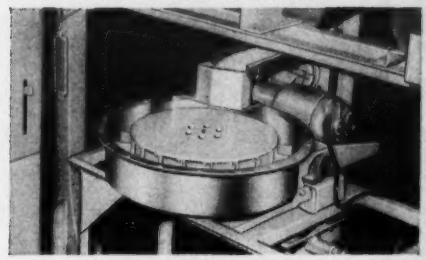
STEPHENS-ADAMSON



REDLER® Conveyor-Elevator

ZIPPER® BELT CONVEYOR-ELEVATORS

BELT CONVEYOR SYSTEMS



CONTINUOUS WEIGHER

SPEEDS EFFICIENCY...LOWERS COST IN CHEMICAL HANDLING

When you consult a conveyor manufacturer on a particular bulk materials handling problem, you do so because the consultant is a specialist in his phase of the business. But think of the advantages if that consultant were not only the manufacturer of a particular type of conveyor but a specialist in chemical handling systems.

STEPHENS-ADAMSON is just that kind of a consultant. The systems that S-A engineers are regularly designing and installing for the chemical processing industry are not based on a desire to sell a particular type of conveyor system — but the most efficient, profitable answer to the problem at hand. The reason is twofold — S-A's broad knowledge of the field and the fact that S-A makes not one, but several kinds of conveyor systems, some exclusive and patented by the company. Over 20,000 successful installations of the S-A Redler Conveyor-Elevator System alone, point up the breadth of S-A experience. Write today for full information.

MORE S-A EQUIPMENT FOR PROFITABLE CHEMICAL HANDLING

- Box Car Unloaders
- SWIVELOADER® Centrifugal Thrower Unit
- TELLEVEL® Bin Level Controls
- Bucket Elevators
- Ship Unloading Systems
- Car Pullers & Spotters

WRITE FOR REDLER CATALOG 358

S-A
MATERIALS HANDLING PRODUCTS
SEALMASTER® BALL BEARING UNITS

ENGINEERING DIVISION
STEPHENS-ADAMSON MFG. CO.
GENERAL OFFICE & MAIN PLANT, 11 RIDGEWAY AVENUE, AURORA, ILLINOIS

PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO

Check 1610 opposite last page

Efficient screening cuts costs, ups sales

SWECO SEPARATOR removes oversize plastic pellets at 6,000 lbs./hr. at Cooke Color & Chemical Company, Hackettstown, N. J.

Cooke Color & Chemical Company needed to screen out oversize plastic pieces from diced polyethylene stock to prevent clogging of filling machines and insure uniform size pellets which customers could use without rescreening. A 48" diameter SWECO Separator was installed with two 3-mesh stainless steel screen cloths. All oversize material was effectively removed. Production down-time of the filling machines was eliminated. Cooke gained a competitive advantage in increased customer acceptance.

If you have a screening problem, write for a test demonstration in your plant, on your own material. Or send for new 20-page catalog and screening data on your specific material.

Write Dept. S-304-3

SWECO

Southwestern Engineering Company
4800 Santa Fe Avenue, Los Angeles 58, California
Engineers–Constructors–Manufacturers

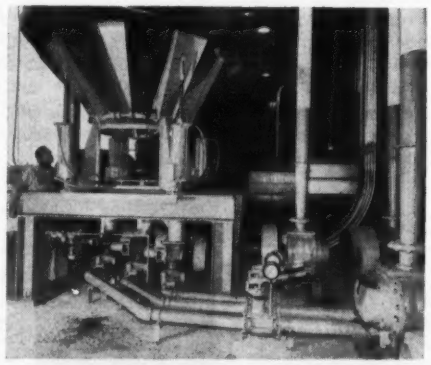
SEPARATORS FOR THE CHEMICAL INDUSTRY

Check 1611 opposite last page

A CHEMICAL PROCESSING FEATURE
MATERIAL HANDLING & PACKAGING

Closing the loop for high-purity shipping

Pneumatic conveyors team with collapsible rubber containers for enclosed bulk handling from production process in one plant to point of use in another



Hydraulic arms on unloading cradle gradually raise to funnel material into discharge mechanisms. Material may be introduced into any of three conveyor systems through three-way receiving spout under container

Shipping, receiving, and storing high-purity materials in collapsible rubber containers (Sealdbins) has streamlined between-plant bulk handling. With the use of pneumatic conveyors to fill and empty these containers, handling can be completely enclosed from point of origin to point of use.

Filling

In filling operations, material is conveyed pneumatically from production or storage to receiver above filling station. It discharges by gravity to rotary feeder and through a diverter mechanism which directs it to any of several containers.

Each container is in a hydraulic loading cradle and inflated with air or inert gas to about ½ psi. The cradle is tilted

Example of pneumatic unloading of collapsible containers at Point Breeze Works of Western Electric Company, Inc., Baltimore, Md. Pneumatic conveyor systems handle 11 colors of polyethylene from containers to process. Handling is controlled by one man at a central control panel

to position filling closure vertically and connected to diverter outlet by flexible sleeve.

Bulk material replaces the air or gas in the container, which is bled off through relief valve. The containers are then sealed for shipping.

Emptying

In-plant pneumatic handling systems can be employed to carry container contents from the Sealdbins direct to process.

Each container is hoisted by its lifting eye onto adjustable cradle stand. Hydraulic arms raise gradually to funnel material to flexible unloading sleeve leading to rotary feeder which discharges to injector. From here it is carried to point of use by conveyor system.

It's obvious that this method of handling can save on costs — on both ends — where manual handling has been extensive. It is often possible for one man, operating from a central control panel, to handle filling or emptying of a number of containers. Dust problems and product waste by spillage can be practically eliminated.

These techniques can be applied to other types of portable containers, of course.

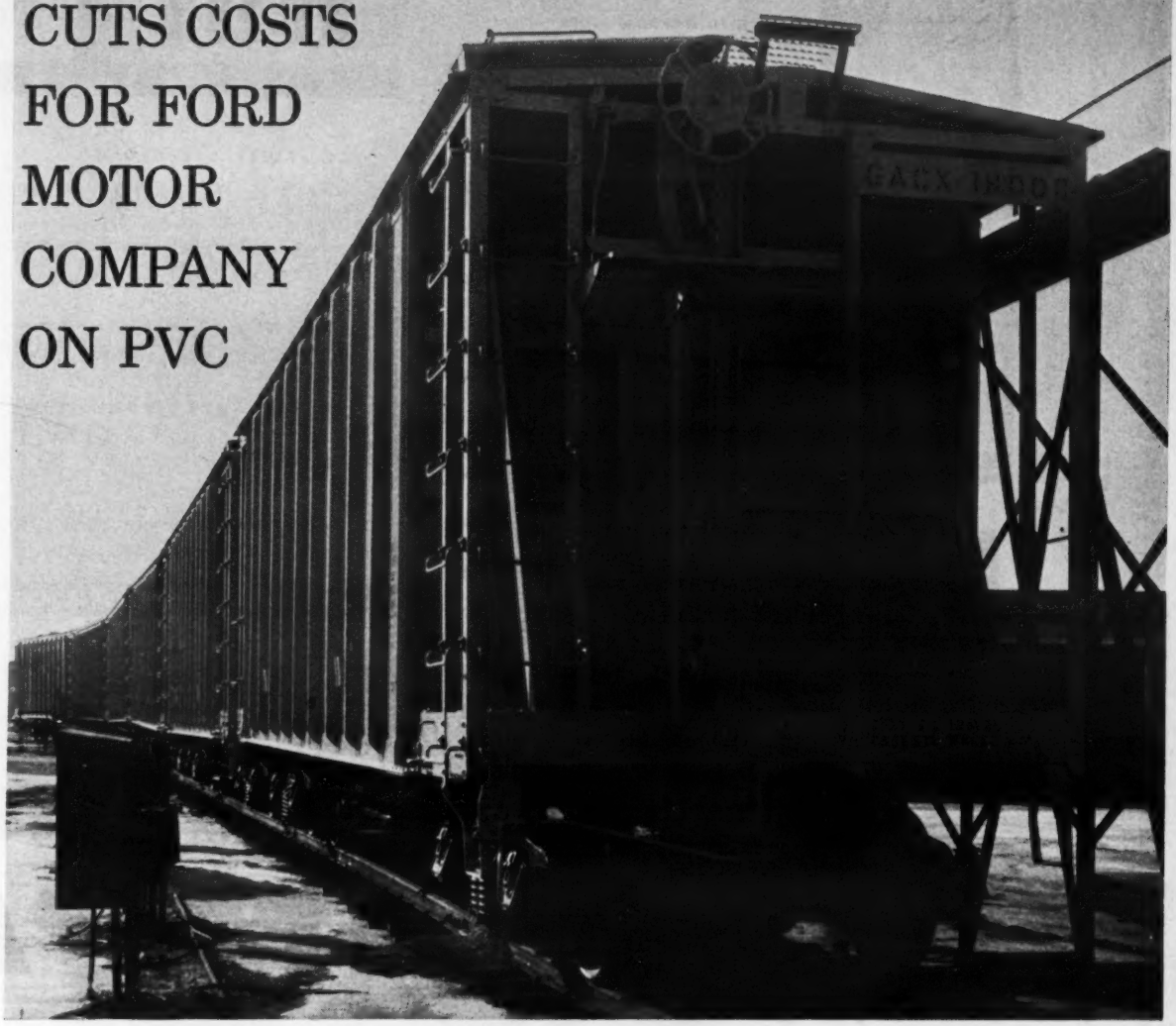
(Pneumatic handling techniques described here are applied by Dracco Division of Fuller Company, PO Box 1794, Cleveland 5, Ohio.)

Check 1612 opposite last page.

(Sealdbins are a product of Container Products Division, U. S. Rubber Company, 10 Eagle St., Providence 1, R. I.)

Check 1613 opposite last page.

BULK SHIPPING VIA AIRSLIDE® CARS CUTS COSTS FOR FORD MOTOR COMPANY ON PVC



Producing a better car for the least possible money is a constant challenge to auto manufacturers. To help solve this problem the Ford Motor Company is cutting costs of transporting PVC resin by bulk shipping in Airslide cars.

As a result, Ford not only gets substantial savings, but receives the PVC without in-transit contamination.

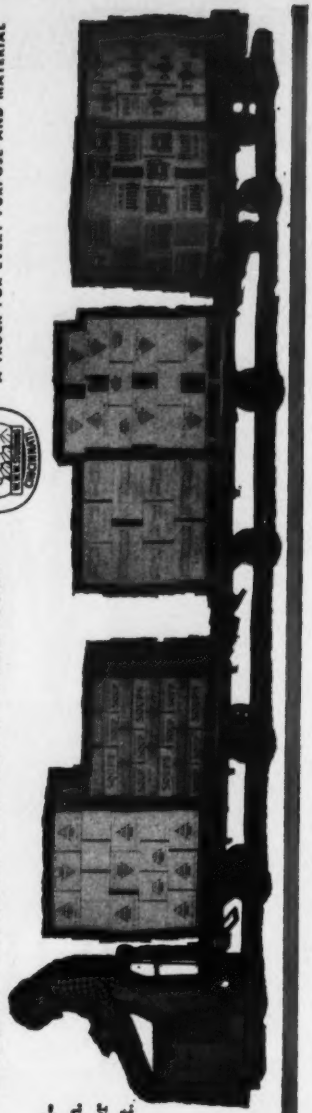
The Airslide car is filled by blowing the resin through one of the top hatches of the car. At the unloading point, low pressure air is used to aerate the PVC and cause it to discharge by gravity. The product is then taken under vacuum through a pipe to storage bins.

If you ship or receive dry granular chemicals in bulk, investigate the advantages of shipping via Airslide car. You'll find *it pays to plan with General America.*

Airslide Car Department
GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South LaSalle Street · Chicago 90, Illinois
In Canada: Canadian General Transit Co., Ltd., Montreal

AIRSLIDE GENERAL AMERICAN TRADE MARK

Check 1614 opposite last page



HydroLectric A GREAT NAME IN LIFT TRUCKS

A TRUCK FOR EVERY PURPOSE AND MATERIAL

This powerful Hydrolectric Tractor hauls one or multiple units with speed, safety and ease of operation. Features the exclusive DYNA-DUAL POWER UNIT. Power enough to pull loads of 6000 lbs. or more at low cost.

Write for Bulletin KT

LIFT TRUCKS, INC.

2427 Spring Grove Avenue, Cincinnati 14, Ohio

Check 1615 opposite last page

HANDLING & PACKAGING

Puts up to 150 valves/min into aerosol cans

Uses: Automatically inserts aerosol-valve assemblies into cans, at speeds to 150/min.

Features: Specially designed guide mechanism assures positive control of dip tube and insertion of close-fitting assemblies. Any length dip tube is easily accommodated, and by use of change-over parts, a full range of can sizes can be handled.

Description: Continuous, rotary, 12-station machine takes valve assemblies from bulk, sorts them, and inserts them. Accessory is available which orients dip tube with printing on can.

(Rl-1200 aerosol valve inserter is product of PMC Industries, Inc., 293 Hudson St., Hackensack, N. J.)

Check 1616 opposite last page.

Twice the loading capacity with half the manpower

Problem: Old, slow, truck-loading system was a bottleneck when Warner W. Price Company, Smyrna, Del., moved into their modern fertilizer plant. New bagging equipment doubled their capacity — from

Conveyor boom follows loading job. It's long when the job starts, short when job is almost done

eight to 16 125-lb bags per minute — and the old method of loading a farmer's truck by shunting a two-wheel hand truck between it and the bag stitcher just wasn't fast enough.

Solution: A conveyor system, made up of standard units, was installed. Bags are filled and placed upright on

WHY YOU GET MORE WHEN YOU BUY VIKING ROTARY PUMPS

COMPLETE SELECTION

In many cases, you can quickly order the pump you need. Why? Because you can select from over 750 catalogued models and thousands of specials . . . in sizes from 2/3 to 1050 gallons per minute. You save time and money buying from this one **complete** source!

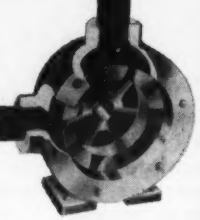
TOP QUALITY

Every Viking Pump has quality built into it — quality that will save you many repair bills. Ask the service man how **he** rates Viking. You will find they have top rating.

ROTARY PUMP "KNOW-HOW"

Engineers at Viking apply and think rotary pumps and **nothing** but rotary pumps. From them, you can get the best information on rotary pump applications . . . no half-way measures at Viking.

Send today for our 8-page folder on Viking Pumps . . . 59SCC



VIKING PUMP COMPANY

Cedar Falls, Iowa, U. S. A. In Canada, it's "ROTO-KING" pumps

See Our Unit in Chemical Engineering Catalog

Check 1617 opposite last page

MIX BETTER BY

IMPACT

Finer and more intimate dispersion of solids can be achieved using an Entoleter® centrifugal impact mill.

- Low cost — low power requirements
- Minimum (controlled) temperature rise

RECENT APPLICATION

For the final dispersion of detergent, bleach, perfume and highly abrasive silica flour in a popular powdered household detergent, this 27" model with abrasion resistant impactors does the job.

Free test runs on your material.

Send for literature on Impact Milling, Particle Size Reduction and the new line of Vibrating Screens.

ENTOLETER

DIVISION OF SAFETY INDUSTRIES, INC.

Check 1618 opposite last page

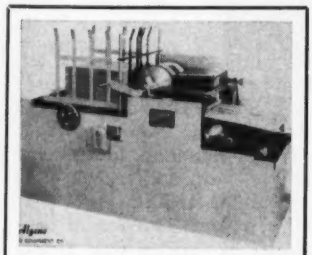
small feeder conveyor, which takes them to stitcher. After stitching, they are placed horizontally on a heavy-duty belt conveyor which takes the bags to a point just inside the loading dock (all straight-run). Here the bags move directly onto an Expand-O-Veyor power-belt conveyor.

The unit has a movable boom which increases its operating length to reach the back of a truck when starting loading. As truck fills, the conveyor is reduced in length so that its end comes in closer to dock—following the job as it were.

Results: Conveying system has doubled loading capacity. Two men now load a truck where four were required before, thus freeing two for other more important work. Fatigue is no longer a problem. Farmer-customers appreciate the speed of loading since they are not held up at the plant as long as before.

(Model 431 heavy-duty power-belt conveyor and Model 439 Expand-O-Veyor are products of Conveyor Dept., A. B. Farquhar Division, The Oliver Corporation, North Duke Street, York, Pa.)

Check 1619 opposite last page.



Flat-box printer

. . . gives quality printing on all four sides of a box, in the flat, in one pass. Unit accommodates all carton sizes up to 50 x 65", prints at speeds to 3500 boxes an hour.

(Flat-box printer is product of Algene Marking Equipment Co., 232 Palisade Ave., Garfield, N. J.)

Check 1620 opposite last page.

JOY LIMBEROLLER . . THE *easy going* BELT CONVEYOR IDLER WITH PLENTY OF BACKBONE

Radically different from all other idlers, the Joy Limberoller is a flexible steel cable suspended between two sealed bearings . . . neoprene discs are molded to the cable . . . forming a single roll idler which turns on its own axis. This imparts a flexing action which is self-cleaning . . . prevents material build-up, a source of trouble with conventional idlers.

The Joy Limberoller idler supports the belt across its entire width in a true catenary . . . doesn't bend or pinch the belt between steel rolls like conventional idlers. Hard materials don't "bump along" from idler to idler, either. Belt life is increased 20% and more.

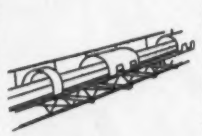
Abrasive or corrosive materials are no problem, because only two bearings are used. They are up out of the dirt zone, not hiding down under the belt where inspection and maintenance are difficult. Joy Manufacturing Company has never replaced a single bearing due to normal failure. Heard enough? Get the whole story from:

Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited: Galt, Ontario.

WSW L7373-269

Write for Free Bulletin 269-80

INDUSTRIAL COMPRESSORS



CONVEYORS

ELECTRICAL CONNECTORS

FANS AND BLOWERS

JOY

SINCE 1851 . . . OVER 100 YEARS OF ENGINEERING LEADERSHIP

Check 1621 opposite last page

PROBLEM: Ground-level loading, Vibradamp Corp., Jackson, Michigan. Two three-man teams and two power trucks were required for loading truck cargos and rail car shipments. As a result, loading costs were too high . . . freight movement lagged, and the men worked under hazardous conditions—manually handling huge drums of the company's asphaltic and resinous products.

SOLUTION: Now, with a Magliner Mobile Loading Ramp on the job, railcar and truck loading both are easily handled by one man and power truck, *in less than half the time formerly required!* And the *Magliner paid for itself in only six weeks!* Four men were released to other departments . . . over-all handling costs reduced.

Do you have an older building or ground-level plant . . . need extra or movable dock facilities? A Magliner Mobile Loading Ramp is the practical money-saving solution. A loading dock on wheels, where you need it . . . when you need it!

Write for Job Report LR-382 and Bulletin DB-211

MAGLINE INC., P.O. BOX 435
Pinconning, Michigan

MagLiner MAGNESIUM
Mobile Loading Ramps

Canadian Factory: Magline of Canada Ltd., Renfrew, Ontario

Check 1622 opposite last page

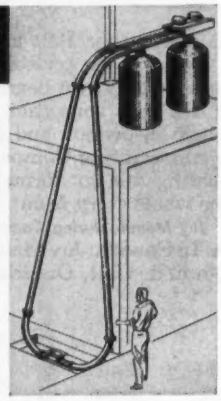
Hapman
TUBULAR CONVEYORS
for Bulk Material Handling

Move almost any flowable material wet or dry — through any plane or angle

Sealed Pin Chain Design Keeps Abrasives Out — Quadruples Chain Life

- **Sealed** casing retains liquids, gases, powders
- **Basically** self supporting, self feeding, self cleaning
- **Degradation** and cross contamination minimized
- **Multiple** discharge and receiving points
- **Minimum** space required for installation
- **Functions** as volumetric feeder
- **Low** maintenance and operating costs
- **Wide** range of materials available for fabrication

...each application engineered for your needs.



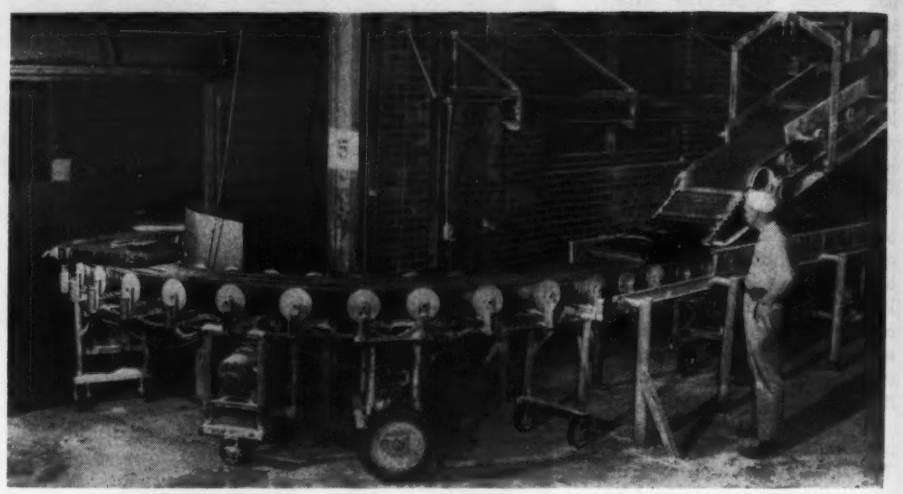
For additional information call . . . write . . . wire

Hapman CONVEYORS, INC.
630 Gibson St.
KALAMAZOO MICHIGAN
Fireside 3-1675

Check 1623 opposite last page

Through 180° turn and directly to stacking area of rail car go 100-lb bags of light soda ash at Diamond Alkali Co. Point-of-stacking delivery means more compact, uniform loading, fewer damage claims, more efficient use of manpower

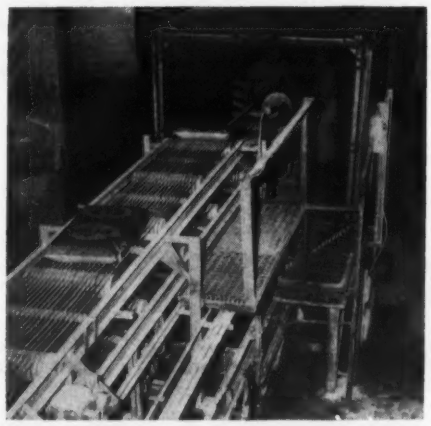
A CHEMICAL PROCESSING FEATURE
MATERIAL HANDLING & PACKAGING



Although prompted by desire to eliminate sifting from light soda ash bags, a full revision of packing and handling system at Diamond Alkali's Painesville, Ohio, plant proved to have many additional advantages. New packing machine and a powered, flexible conveyor resulted in . . .

Better packing and loading, 40% manpower efficiency increase

THEODORE W. WETT, Associate Editor
with **J. H. SHAEFFER**
Assistant General Superintendent
Soda Products Division, Diamond Alkali Company,
Painesville, Ohio



PROBLEM: Sifting of light soda ash was a source of product loss and a housekeeping headache at Diamond Alkali's Painesville, Ohio, plant. Valve-type bags lost product during handling, loading and shipping. Railroad cars and trucks often required considerable cleanup.

In addition, a general revision of bagging and loading procedure was undertaken to ease loading operations and improve efficiency.

Bags formerly were taken from end of packer conveyor and loaded six to seven high on a hand truck. These stacks were then placed in rail cars or trucks without restacking. Resulting load, while adequate, tended to shift during shipment causing damage claims and loss of time and money.

Solution: In late 1956, packing and

To page 64

Straight-to-stackers delivery has completely eliminated hand trucking. Conveyor has motor-driven shuttle mechanism which permits entire unit to be backed toward truck opening while bags are in motion

WHAT DO YOU THINK?

Opinions and comments on the significant subjects carried in each month's CHEMICAL PROCESSING are important! We *welcome* your letters expressing your views. Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in CHEMICAL PROCESSING, others will have the opportunity to hear your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

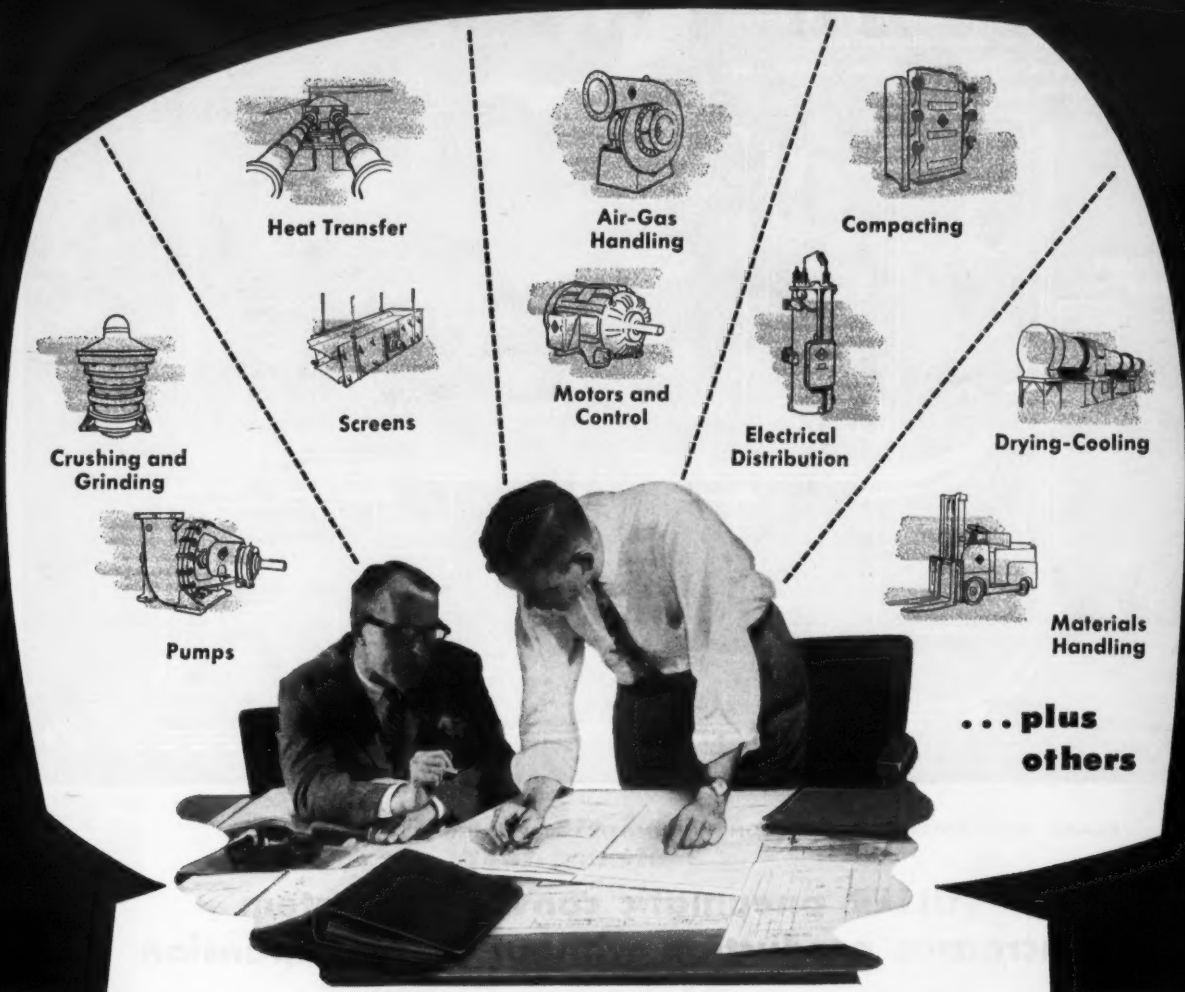
You might even have a thought or angle which wasn't expressed.

If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 7.)

Address your comments to:
The Editor
CHEMICAL PROCESSING
111 E. Delaware Place, Chicago 11, Illinois

For more information on product at right, specify 1624 see information request blank opposite last page.

SCOPE of PRODUCT LINES from ... **ALLIS-CHALMERS**



ONE man can provide
all this "teamed" equipment

He's your Allis-Chalmers representative. *One inquiry* to him and much of the equipment for any process expansion or modernization is available.

Time and money-saving advantages of this single source are obvious. Further, you're assured of "teamed" equipment, engineered by A-C chemical industry specialists. And, once installed, this equipment continues to be backed by outstanding field service.

ASK "THE MAN" about the tremendous scope of A-C equipment for petro-chemicals ... equipment that's built for the finest quality control. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Products for Petro-Chemicals: *Electrical Generation, Distribution and Utilization Equipment; Pumps (rotary vacuum and centrifugal); Mechanical Power Transmission Equipment; Processing Machinery (mills, kilns, screens, etc.); Water Conditioning Systems, plus Materials Handling Equipment.*

A-C ALLIS-CHALMERS

A 5983 C

Soda Ash Handling

From page 62

loading system were revised. Two model "A" Bagpakers, automatic bag filling, closing, and sealing machines, were installed. Bags were changed from valve-type to sewn.

Two flexible, mobile, powered, conveying sections were purchased to serve four loading stations. These receive 100-lb bags from packer conveyor and carry them directly into rail car, through 180° turn when necessary.

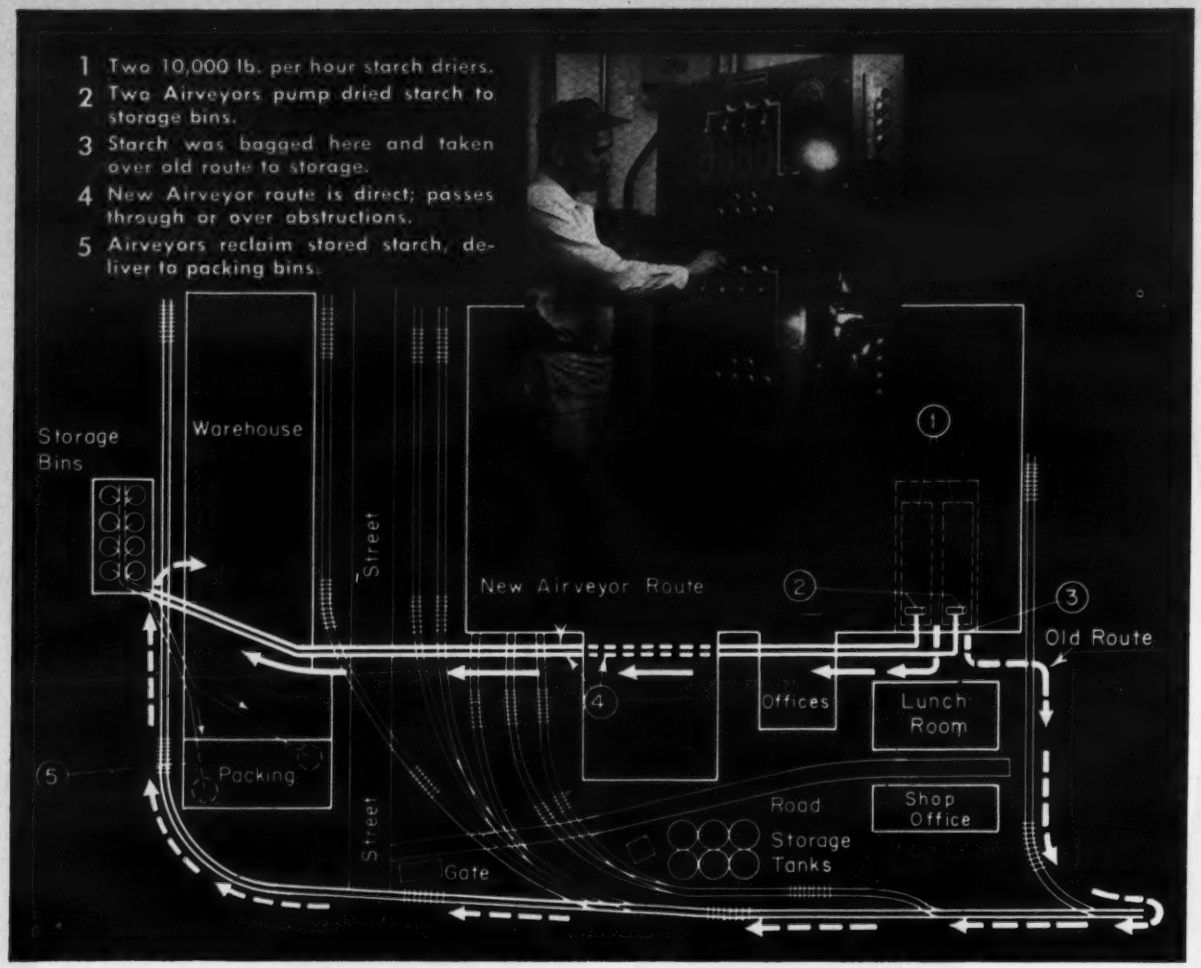
Packing machine on balcony level weighs, fills, settles, sews, and seals bags. Operator hangs empty bag on bag spout as turret revolves before him. All functions are completely automatic. Filled bags are discharged to take-away conveyor. Unit is timed to fill 18 bags/min.

Bags pass through a flattener and are directed on belt conveyors to proper loading station where they drop down inclined section to flexible conveyor. A straight section of powered conveyor serves a fifth loading station, used for trucks.

Power-curve conveyor consists of a series of endless spring belts operated over grooved aluminum rollers. Each spring forms a belt between the rollers and when conveyor is bent, outside springs stretch, inside springs contract. By driving one roller, power is transmitted to entire length of conveyor. In addition, motor-driven shuttle mechanism makes unit self-propelled. As loading progresses, unit is moved backward toward car or truck opening while conveyor is running. Bags are always delivered directly to stacking area.

Because of exceptionally severe service conditions (Unit is subjected to heavy impact as 100-lb. bags come down incline from balcony level. Although conveyors are recommended for a 90° maximum turn, existing facilities dictated a 180° turn.) some modifications were necessary in flexible conveyor. Additional

To page 122



PLANT MODERNIZATION THROUGH PNEUMATIC CONVEYING

FULLER pneumatic conveying system increases production without plant expansion

To increase production, the Union Starch and Refining Company's Granite City, Ill., plant first needed to expand their materials handling system. But a complete revamping of bagging and warehouse operations was impossible because there was no space available for necessary new buildings.

An Airveyor® System, engineered and built by Fuller, was the answer. Airveyor's extreme flexibility allowed it to be set up through walls, along sides of buildings, over streets, on roofs and up inclines. At Union Starch, the total distance covered is 800 feet, with a number of 45 degree and 90 degree bends in the line.

The Fuller Airveyor system transports the starch in two phases, from the driers to the storage bins and from the bins to receiving hoppers over the bagging machines. Flow is controlled automatically through control panels located in the drier room and at the bagging machines. Other controls are also provided at the panels for automatic operation of components such as feeders, blowers, conveyors and filter-receivers.

Besides being easily installed and automatically controlled, the Fuller system reduces both the amount and the expense of handling. Additional savings are made possible by Airveyor's self-cleaning facility, which greatly reduces maintenance costs.

Why not work with Fuller to design an automated pneumatic materials handling system that will help you cut costs and increase production? Write today for complete details. A-280 1335

FULLER COMPANY
136 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • New York • San Francisco • Seattle

Fuller
pioneers in harnessing AIR

Check 1625 opposite last page

THAT'S INTERESTING

Turbo autos

They're possible by '65, says Prof. Frank L. Schwartz of University of Michigan. Technical problems have been licked, he says. Major problems remaining are chassis and body designs and reduction of turbine manufacturing costs.

Ups, down in power

National Planning Association predicts average price of delivered electrical energy will rise 15% or 20% by 1980. At this point, it is felt, atomic power may cut power costs in some regions. But with A-power costs the same from region to region, energy costs would be gradually equalized. Result: more freedom in choosing new plant locations. Manpower and proximity of raw materials would then have greater bearing on industrial location than power.

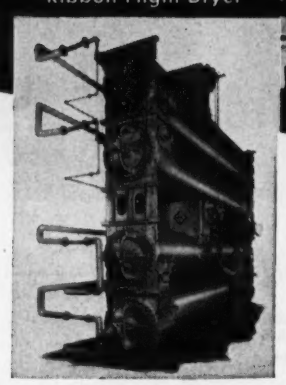
For more information on product at right, specify 1626 see information request blank opposite last page.

SCOPE in INDUSTRY SPECIALIZATION from... **ALLIS-CHALMERS**

Plan to stay ahead... MODERNIZE

Sure-fire heat-transfer efficiency

...comes in a package



A HARD-WORKING kiln—particularly an Allis-Chalmers kiln—has a burning desire to cut costs, increase chemical production and improve quality. But that kiln's fired-up ambition just smolders *unless* it is associated with equally efficient equipment in a well-designed flow.

As the world's leading producer of rotary kilns, dryers and coolers, Allis-Chalmers is concerned with the entire heat-transfer operation . . . the evaluation of variables . . . the integration of interdependent equipment, old and new, into a profitable process. Flow design, prerecommendation research and testing, and installation advice are all part of the Allis-Chalmers package.

Ask your A-C man for Bulletin 25C6177, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.

A-C ALLIS-CHALMERS A-5954

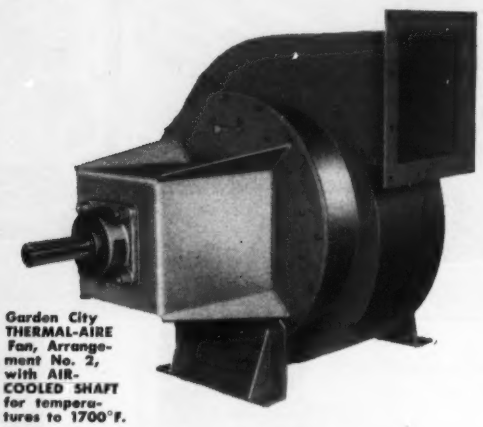
A completely NEW line!

GARDEN CITY

RF THERMAL-AIRE FANS

- simple to install
- inexpensive to maintain
- temperatures to 1850°F.

Garden City's new RF THERMAL-AIRE radial blade fans are durable, trouble-free, efficient. Modern, simplified in design, they are "tailored" for various temperatures to precisely meet your needs.



Garden City THERMAL-AIRE Fan, Arrangement No. 2, with AIR-COOLED SHAFT for temperatures to 1700°F.

Write Today!

Garden City Fan Company
801 North Eighth Street
Niles, Michigan

Send me fully illustrated information on application checked below:

☐ THERMAL-AIRE fans for moving air or gases at elevated temperatures.

☐ Industrial fans for exhausting dust, fumes and other atmospheric contaminants.

☐ Industrial fans for material handling of paper, metal and wood shavings, sawdust, etc.

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GARDEN CITY FAN COMPANY
ESTABLISHED 1879

Representatives in leading cities

801 North Eighth Street, Niles, Michigan (Department P)

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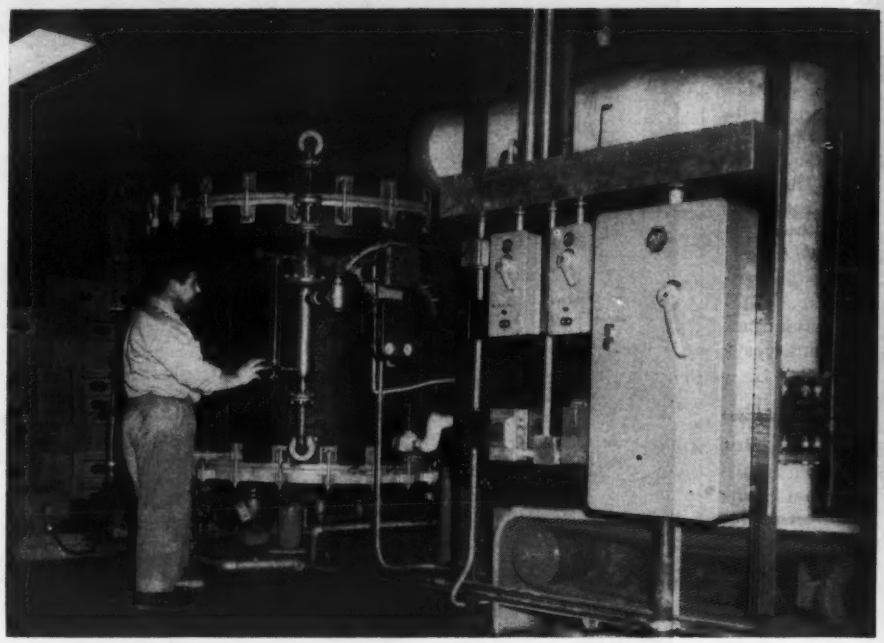


Increasing demand for ultra-pure water necessitated changeover to efficient, economical method for converting large volumes of Lake Michigan water to products used for intravenous injections. Abbott Laboratories installed vapor compression distillation units which . . .

Produce one ppm water at big savings in cost

PAUL HOFFMAN, News Editor
with **WILLIAM HAYDEN**
Manager of Utilities
Abbott Laboratories
North Chicago, Ill.

Problem: Capacity of existing distillation equipment for converting Lake Michigan water into high-purity water used in preparing pharmaceutical solutions for intravenous injections was inadequate to keep pace with increasing demand at Abbott Laboratories, North Chicago, Illinois.

An efficient and economical method of producing large volumes of ultra-pure water was needed.

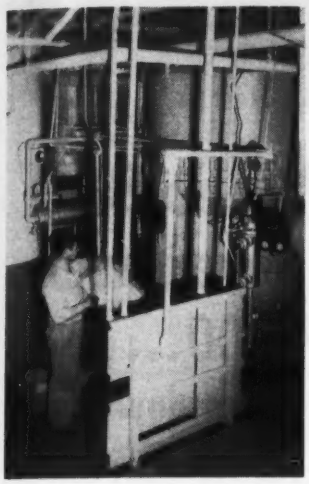
Existing equipment, although performing satisfactorily, required considerable maintenance and repair. Furthermore, descaling resulted in considerable downtime. Operating costs also were high.

Solution: A lengthy investigation was conducted of various methods. The company chose two electric-driven fresh water vapor compression distillation units. Each has a capacity of 800 gph.

Feed water, which is filtered and chlorinated, is purchased from the cities of North Chicago and Waukegan, Ill. It is chemically softened in the first step of converting it into high purity distilled water. Electric interlocking valve in feed line prevents still from flooding as feed water is admitted.

The vapor compression process is started by heating feed water in the

Last of three vapor compression distillation units installed at Abbott Laboratories which has capacity of 800 gph of ultra-pure distilled water



One of the original vapor compression distillation units. Their installation has made possible a substantial reduction in production, maintenance, and operating costs

evaporator. As water boils within tubes, steam is produced. This is drawn through a steam separator, where entrained particles are removed.

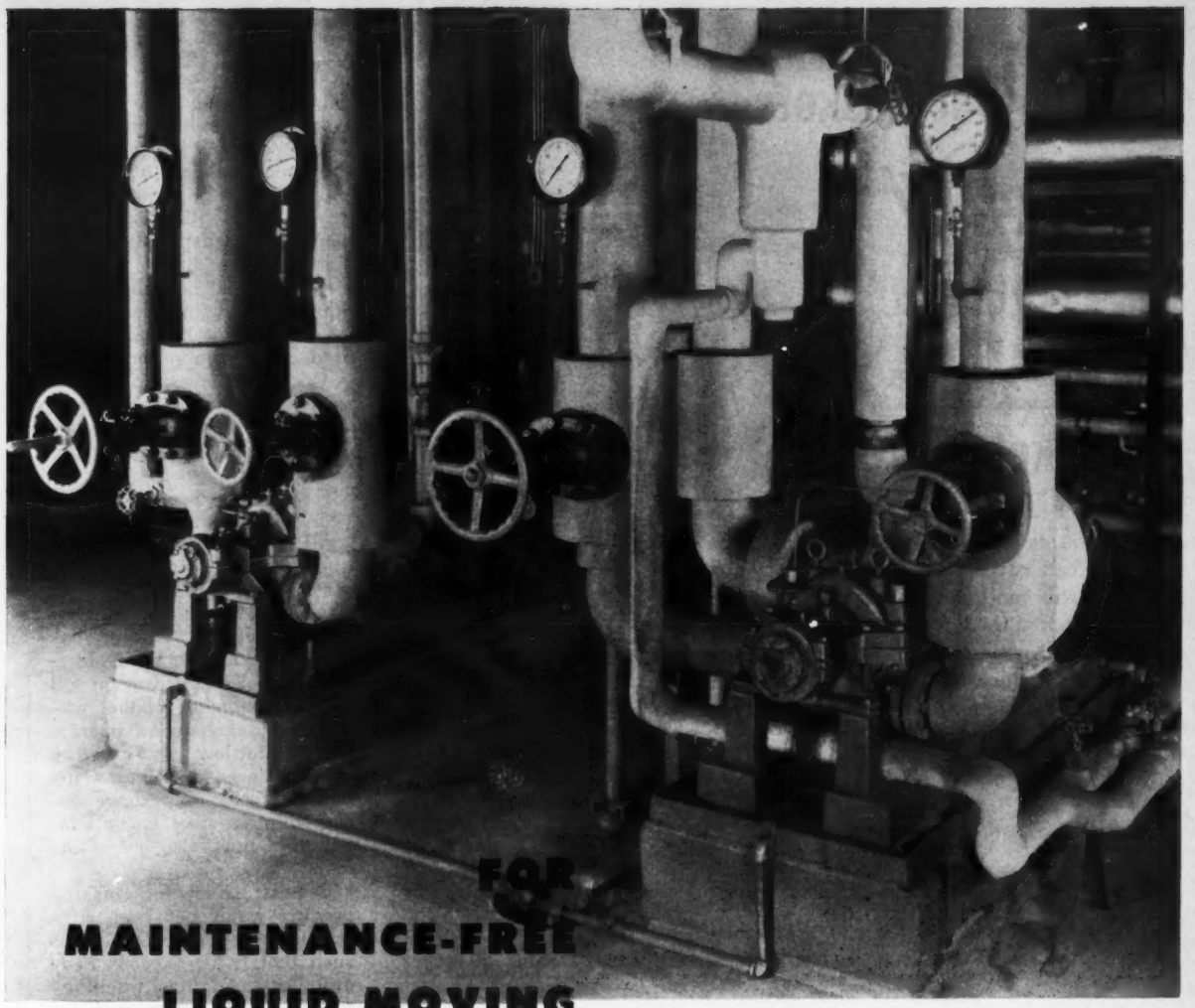
Vapor enters compressor at 218° F. It contains 1,152 Btu/lb. Compressed steam from compressor goes to steam chest. There it condenses on the outer tube surfaces and is drawn off as pure distillate.

Since temperature of compressed steam condensing on tubes is higher than that of boiling water in tubes, heat transfers from steam to water and creates more steam. Latent heat is recovered for use in heating feed water.

Part of Heat Reclaimed

Heat exchangers reclaim part of the heat in blowdown, distillate, and non-condensible gases by transfer to cold water entering the evaporator. Cooling water and waste steam supply additional heat required to maintain heat balance and keep process going.

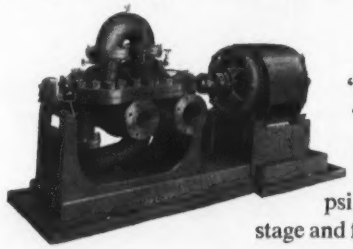
After water leaves distillate heat exchanger, it is monitored for pH and specific conductivity. Values are recorded automatically on a



FOR MAINTENANCE-FREE LIQUID MOVING

"Buffalo" Class "RR" Pumps

For boiler feed and other high pressure, high temperature applications with clear water, "RR" Pumps deliver the utmost performance with an absolute minimum of maintenance. The unique "Buffalo" Class "RR" design is unsurpassed for consistent hydraulic balance. Rugged "Buffalo" construction features include efficient impellers — extra generous bearings and shafts — rigid casings with simply-formed passages to avoid friction losses — very deep stuffing boxes to accommodate more packing.



"Buffalo" Type "RR" Boiler Feed Pumps for pressures up to 500 psi. Available in two-stage and four-stage models.

These superior "Buffalo" design and construction features assure you of pumps that will stand up under continuous punishing service — that require practically no attention other than lubrication — that deliver more water at less cost for power.

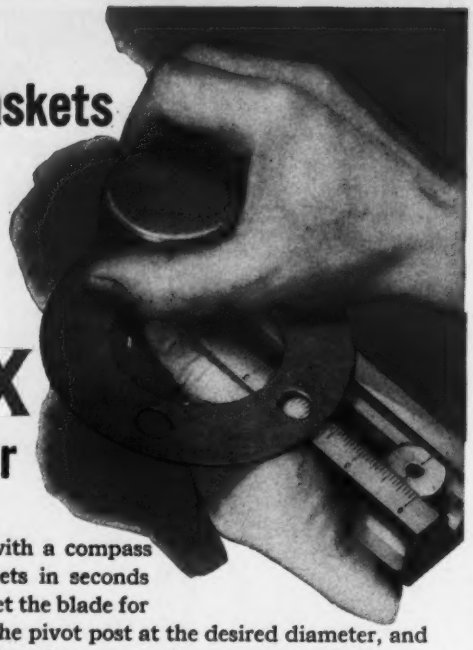
The "Buffalo" Class "RR" Pump is your best buy for clear water service — hot or cold — against heads as high as 1500 feet — at capacities up to 900 gpm. Ask your nearby "Buffalo" engineering representative for full information, or write us for Bulletin 980-D.

"Buffalo" Pumps bring you the famous "Q" Factor — the built-in QUALITY that provides trouble-free satisfaction and long life.

BUFFALO PUMPS
Division of Buffalo Forge Co.
"Buffalo" PUMPS
524 Broadway • Buffalo, N. Y.
Canada Pumps, Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities
A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

Check 1628 opposite last page

Cut Perfect Gaskets *Easily* with the ALLPAX Gasket Cutter



If you can draw circles with a compass you can cut perfect gaskets in seconds with this handy kit. Just set the blade for the desired thickness, set the pivot post at the desired diameter, and a smooth swing of the cutter gives you a clean, accurate gasket . . . from a ¼ inch bolt hole to a 60 inch outside cut. Larger diameters can be cut with additional extension arms.

Gasket Cutter is packaged in this strong steel case.

The ALLPAX Gasket Cutter has become standard equipment in thousands of plants where expensive "down time" is kept at a minimum by cutting new gaskets when and where they are needed. Available in five styles to cut maximum diameters of 12, 24, 36, 48, 60 inches.

Use the following Allpax gasket materials for your gasket requirements:

400 —Compressed Asbestos Sheet
500 —Superheat Compressed Asbestos Sheet
600 —Vegetable Fiber Oil Proof Sheet
700 —Red Rubber Sheet
750 —Black Rubber Sheet
800 —Diaphragm Sheet
850 —Cloth-Inserted Sheet

ALLPAX
"The Packing that Packs All"

SEND FOR OUR NEW CATALOG — TODAY!

A complete line of packing, tools, gasket materials
Distributors in principal cities

THE ALLPAX COMPANY, INC.
160 Jefferson Ave., Mamaroneck, N. Y.
CANADIAN DISTRIBUTORS: Albion Asbestos Packings Ltd., Montreal 8, Quebec

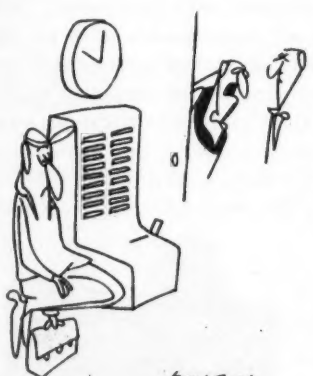
Check 1629 opposite last page

chart. If conductivity exceeds a certain pre-set limit, dump valve opens and water goes to a chemical sewer, thus guaranteeing that no water which is not well within specifications enters distribution system.

Bulk of heat needed to continue distilling process comes from recycling heat of steam produced within system. Compression of vapor supplies heat required to maintain temperature difference across tubes and continues boiling within tubes. Compressed vapor is 228°F, and has heat content of 1,156 Btu/lb.

All surfaces contacting distilled water except the compressor are No. 304 stainless steel. All-bronze compressor is axial-flow, positive displacement. Compressor is double-sealed to prevent oil contamination of product water. Heat exchangers operate on counterflow principle within concentric tubes. Centrifugal-type pumps have No. 304 stainless steel parts. Distribution lines also are stainless.

Results: Cost of making product water has been substantially reduced. Quality is such that it far exceeds Federal Drug Administration requirements. All pyrogens are removed from feed water, whose purity in dissolved parts is 149 ppm. Final prod-



". . . That couldn't be somebody punching in at 10 o'clock. . ."

Plastic Steel® saved over $1000... plus days of downtime for MARRINER

A broken centrifuge at Marriner Combing Company stopped production on an important order. PLASTIC STEEL was used for on-the-spot repairs and the machine was back in operation within an hour at a cost of less than $5.00. Using conventional repair methods would involve several days and cost over $1000.

Hundreds of companies have saved time and money by repairing worn machine parts, cracked castings, leaking hydraulic systems and tanks, rebuilding worn pumps or valves, etc., with PLASTIC STEEL®.

PLASTIC STEEL® and other Devcon products are used for making jigs, fixtures, metal-forming dies, plastic and rubber molds, foundry patterns and core boxes, and other industrial tools.

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Check 1630 opposite last page

uct has purity of less than one ppm.

Maintenance and operating costs have been minimized. After more than eight years' service, units operate nearly a month before being pulled off the line for recalibration of instruments and controls made necessary because of vibration.

A third unit, installed a year ago, incorporates modifications that have further reduced maintenance problems.

Downtime has been reduced to about 3% of the total time units are on stream. Length between normal shutdowns has been extended to approximately every four months. These shutdowns are made to acid-clean equipment to improve heat transfer rates. Unit usually is down about 10 hours. Major shutdowns are made once a year for general overhaul.

Higher utilization of equipment has been realized by lengthening the work week without threat of enforced shutdowns.

(Model F800E vapor compression evaporator is development of Special Products Division, Cleaver-Brooks Co., 326 East Keefe Ave., Milwaukee 12, Wis.)

Check 1631 opposite last page.

Electrical Heating

From page 30

required on electric heating system since it was placed in service. Operation is considered to be completely safe. Use of electric heating enabled plant to make installation at a moderate capital expenditure. It costs approximately $8 per day for electricity for 6-hr cooking day.

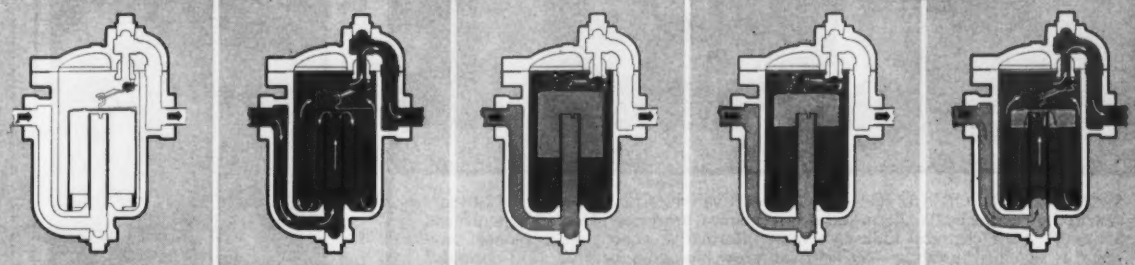
(Electric heating mantle is product of Glas-Col Apparatus Co., 711 Hulman St., Terre Haute, Indiana.)

Check 1632 opposite last page.

(Glass-Lined reactor is product of Glascote Products, Inc., subsidiary A. O. Smith Corp., Cleveland 17, Ohio.)

Check 1633 opposite last page.

This simple trap operating principle provides the efficiency, dependability and freedom from maintenance necessary for the most profitable use of steam



When trap is first installed, the inverted bucket is down and the valve is wide open.

When steam is turned on, condensate (solid color) flows into trap and out through discharge orifice, until —

Steam (light color) reaching the trap floats the inverted bucket and closes the valve.

When more condensate enters the trap, the bucket loses buoyancy and pulls on valve lever.

When weight of bucket times leverage overcomes pressure on valve, bucket sinks and opens trap.

Key: condensate steam steam bubbles air bubbles

ARMSTRONG INVERTED BUCKET STEAM TRAPS

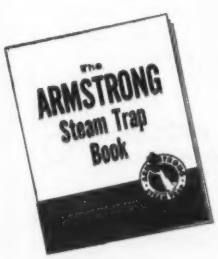
are designed and made to give you these big benefits:

● Amstrong Traps, the first inverted bucket steam traps, now represent the most advanced development of this time-proven principle. They provide all the advantages necessary for efficient, economical condensate drainage from virtually all types of steam using equipment.

1. *No steam loss* – Steam never reaches the orifice even when there is no condensate load.
2. *Automatic air elimination* – Vent in trap bucket passes air and other non-condensibles through to be discharged with condensate.
3. *No cooling leg required* – Condensate is discharged at steam temperature as fast as it reaches the trap because trap operates on difference in density between steam and water not on temperature.
4. *Operates on any back pressure* – Failure of one trap in system will not cause others to open because high back pressure does not affect an Armstrong trap other than to reduce capacity. As long as there is a pressure differential across the orifice the trap will close on steam and open for condensate.
5. *Unaffected by ordinary dirt* — Swirling action of condensate keeps dirt in suspension until discharged with condensate, prevents it from lodging in valve.
6. *Completely dependable* — Proved design plus the use of all stainless steel working parts assure continuity of service and length of service unmatched by any other trap.
7. *Big capacity in a small, economical package* — Armstrong design gives you the highest practical capacity for any given pressure. And remember, Armstrong capacity ratings are based on *hot* condensate at the *working pressure differential* stated, not on theoretical orifice capacities.

Further information on these advantages plus much additional information is given in the 48 page Armstrong Steam Trap Book. Ask your local Armstrong Representative or write direct.

860 Series for low pressure heating service. 800 Series, side inlet, side outlet. No. 801, side inlet, bottom outlet. 880 Series, integral strainer. 200 Series, bottom inlet, top outlet. Forged Steel Series for high pressures, high temperatures.



The 48 page Armstrong Steam Trap Book tells how to correctly size, install and maintain steam traps for any pressure, any temperature, any load plus full catalog data on Armstrong Steam Traps. Ask for Catalog K.

ARMSTRONG MACHINE WORKS

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Check 1634 opposite last page

MOST MAJOR U.S. CHEMICAL PRODUCERS REDUCE COSTS with PANALARM ANNUNCIATORS

MAXIMUM INFORMATION on all process variables . . . the result of 10 years system engineering by Panalarm and major chemical producers. That's why Universal Series 50 is the chemical industry's most informative annunciator. Trouble anywhere is signalled instantly—*before* it can grow big and expensive. "Off-normals" are pinpointed instantly, accurately for fast remedial action, reducing costly downtime.

Economical, highly flexible design facilities system expansion. Can be simply adapted to your exact requirement, avoiding costly custom designing. Proven components—e.g., almost 1,000,000 dependable Panalarm developed relays have been used in Panalarm Annunciators.

Ask your nearby Panalarm sales engineer to show you why Universal Series 50 is the chemical industry's No. 1 annunciator choice . . . how its adaptability and reliability can help increase your profits . . . by producing maximum information and reducing costly downtime. No obligation, of course.

Write for Catalog 100 B today.

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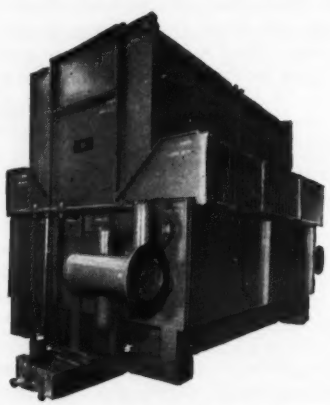
Division of

PANELLIT, INC.

7401 No. Hamlin Ave., Skokie, Ill.

Check 1635 opposite last page

ECONOMICAL COOLING OF GASES AND COMPRESSED AIR



Cooling gases or cooling and removing moisture from compressed air, the Niagara *Aero* After Cooler offers the most economical and trustworthy method. Cooling by evaporation in a closed system, it brings the gas or compressed air to a point below the ambient temperature, effectively preventing further condensation of moisture in the air lines. It is a self-contained system, independent of any large cooling water supply, solving the problems of water supply and disposal.

Cooling-water savings and power-cost savings in operation return your equipment costs in less than two years. New sectional design reduces the first cost, saves you much money in freight, installation labor and upkeep. Niagara *Aero* After Cooler systems have proven most successful in large plant power and process installations and in air and gas liquefaction applications.

Write for Descriptive Bulletin 130.

NIAGARA BLOWER COMPANY

Dept. CP-5, 405 Lexington Ave., New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

Check 1636 opposite last page

NEW SOLUTIONS

Magnetic separator

. . . of induced-roll type is operating successfully in several mineral processing plants. Basic design of unit consists of a number of inductively-magnetized rolls arranged vertically.

Each roll revolves in controlled magnetic circuit. Material is gravity-fed to each roll successively. Least responsive particles are separated out at last roll, where magnetic intensity is strongest.

(Induced-roll magnetic separator is product of Stearns Magnetic Products, 635 S. 28th St., Milwaukee 46, Wisconsin.)

Check 1637 opp. last page.

WANTED: NOMOGRAPHS — WORTH $20 EACH!

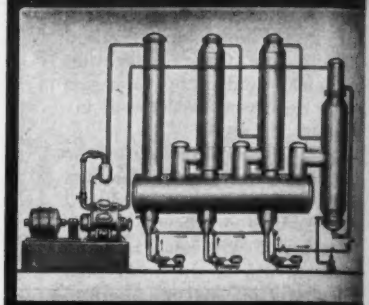
Do you have a pet nomograph that could save time for other CHEMICAL PROCESSING readers? If so, send it neatly and accurately drawn, with a double spaced, typewritten description to:

Data Editor

CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

We will pay $20 for each one accepted and published.

Mojonnier LO-TEMP EVAPORATORS



for

- concentrating heat sensitive chemical solutions
- recovering solvents

- No steam required.
- Uses negligible amount of condensing water.
- Low operating temperatures.
- Less operating attention.

adds up to ***lowest concentrating cost!***

Pictured Above — **MOJONNIER TRIPLE-EFFECT LO-TEMP EVAPORATOR** as installed in large chemical plant, evaporating 5,000 lbs. of water per hour from a chemical solution at a maximum temperature of approximately 40° C. The unit uses a 75 h.p. ammonia compressor.

Full details on the Lo-Temp Process will be sent you promptly.

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LO-TEMP EVAPORATORS

Sales Offices in Principal Cities

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ROCESS PIPING POINTERS

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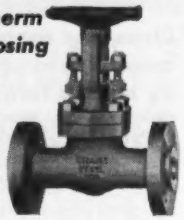
ed careful choosing



owtherm's high uidity demands aximum tightness stem, bonnet and nd connections of alves. Its nonlubri- ating nature calls or seating materials ith high resistance galling, wear and erosion. The 600- ound steel gate shown gives excellent ervice on this hard-to-hold fluid. Seat- ng metals are Exelloy (12% chromium teel) to Nitri-Hard (stainless steel ith extremely hard surface). Stuffing ox has special packing. Bonnet is olted, has gasketed male and female oint. End flange faces machined for asket or ring joint. Socket- or butt- welding ends also available. Companion lobe valves with same end connections re supplied. Ask for data on 3615XW Dowtherm valves. See below.

Do you have your copy of "Flow of Fluids"?

This book will be one of your most valuable technical references on flow through valves, fittings and pipe. Gives newest information on theory of flow, with auxiliary data —formulas, nomographs, tables and procedures—for solving any but the most unusual fluid flow problems. Organized for easy use; durably bound. Free to process piping engineers. Ask for publication No. 410—see below.

New body . . . new body rings for 300-pound bronze valves

Cylindrical body shape, heretofore used only for high-pressure steel valves, now eliminates internal and external stress concentration in 300-pound bronze gate valves. Hex ends are stronger, better integrated with body, and provide wider surfaces for wrench grip. Improved design includes new hard Exelloy rolled-in body seat rings and easy-to-renew all-bronze disc. Valves are easier to repair because disc takes all normal seating wear. See more information and literature offer in Crane ad on next page.

For literature or data on products listed above, please contact J. E. Bradbury, Manager, Chemical Sales Dept. No obligation.

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Gen'l Offices: 836 S. Michigan Ave., Chicago 5

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Purge Calculations

K. A. HARPER
Supervising Process Engineer
Refining Dept.
Phillips Petroleum Co.
Bartlesville, Okla.

Many cases arise in chemical processing where an inventory of material is purged by adding small increments of a new material and withdrawing small increments of the mixture. Calculating the time required (or material required) to purge to a given percent of the equilibrium change is often necessary.

If it is assumed that the material withdrawn is always of the same composition as the inventory, this calculation is straight-forward.

Let

P = new material added, % of inventory
C = % of new material present in inventory

A differential equation representing the effect of adding a small increment of new material and withdrawing the same amount of (perfectly mixed) inventory is as follows:

$$dC = \frac{dP\,(100 - C)}{100} \qquad dP = \frac{100\,dC}{100 - C}$$

integrating

$$P = 100 \ln \frac{100}{100 - C} = 230.3 \log \frac{100}{100 - C}$$

Let

θ = days elapsed
M = average daily makeup, % of inventory

Then

$$\theta = \frac{P}{M} = \frac{230.3}{M} \log \frac{100}{100 - C}$$

These equations have been converted into the accompanying nomograph.

Typical Example

Occasionally an FCC unit is operating on one type of catalyst, and a change to a new type of catalyst is accomplished by simply using the new catalyst for makup. This type of problem prompted development of this equation initially. Actually, the stack losses are not the same concentration of the new catalyst as the unit inventory. However, this method is still useful in approximating the change-over time. Even chemical analysis is subject to some difficulty due to fluctuations of the content of key component in the new catalyst.

For example, calculate time required to reach 90% of new catalyst in the unit if makeup is 2% of inventory daily. Connecting 2 on M scale to 90% on C scale gives time required of 115 days.

The nomograph can easily be used to calculate the time to get from one concentration to another. At 2% makeup, the time to get from 60% to 90% would be 115 minus 46 or 69 days.

Other Applications

A less obvious use of this equation is in changes of contaminant levels of the catalyst. Assume the contaminants added daily as being deposited on the new catalyst exclusively and calculate results as before.

Other applications include accumulators, storage tanks, tank cars, etc., which will purge similarly if continuous mixing occurs. This may be from off-specification to acceptable products or from one specification to another.

The last scale on the left is total purge (P) as % of inventory. On some problems it will be simpler to use this figure. In that case, C can be read directly on the adjoining scale. For example, addition of makeup amounting to 100% of inventory gives 62% of the new material in the inventory.

nomograph on page 73

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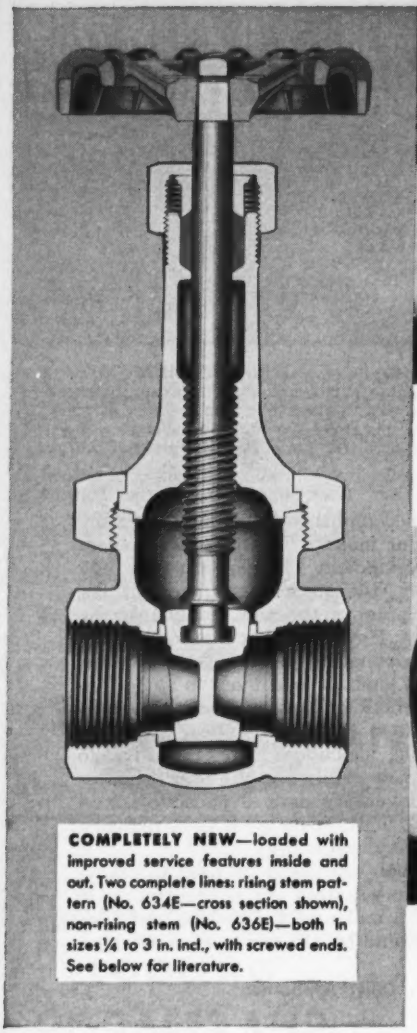
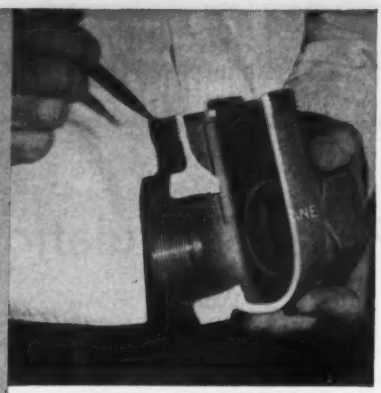
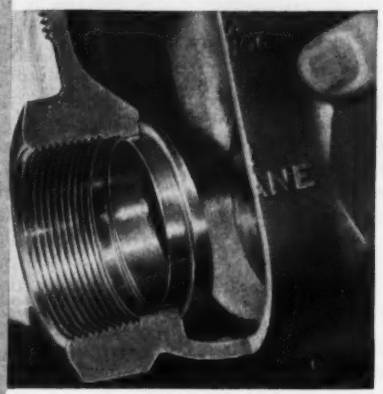


COMPLETELY NEW—loaded with improved service features inside and out. Two complete lines: rising stem pattern (No. 634E—cross section shown), non-rising stem (No. 636E)—both in sizes ¼ to 3 in. incl., with screwed ends. See below for literature.



NEW CYLINDRICAL BODY SHAPE—a proven design on high-pressure steel valves—increases strength without added bulk, distributes pressure load uniformly, resists distortion and leakage at seats.

NEW, STRONGER HEX ENDS, better integrated with body, eliminate sharp contours, give entire valve more rigidity under line strains. Wider hex faces allow firmer wrench grip for easier installation. Marring less likely.



NEW, EXPANDED-TYPE BODY RINGS insure long, tight-seating service life. They're rolled in, can't work loose. Shoulder at bottom of end threads restrains excessive entry of pipe against possible seat damage.

NEW EXELLOY, 12% chromium steel body rings give a hard bearing surface, highly resistant to wear, indentation, scoring and foreign matter damage. Easily replaced bronze disc takes the brunt of normal wear.

New design for tough service...easy maintenance

300-Pound Wedge Disc Bronze Gate Valves

Rising Stem and Non-Rising Stem Patterns

A new body shape that distributes greater strength uniformly against internal stresses and external strains . . . better integrated hex ends, huskier and wider, that add to body rigidity and give a firmer wrench grip . . . new rolled-in, high wear-resisting alloy body rings that don't work loose . . . easily renewed wedge disc—these are typical important features of new Crane bronze gate valves.

On your toughest services, these valves assure ultimate durability . . . new ease of application . . . low-cost repairability. And they're priced no higher than ordinary 300-pound integral seat bronze valves.

Easy to Repair—The Disc Takes the Wear

After long, hard service the hard Exelloy (12% chromium) body rings show no appreciable wear. Normal seating wear is taken by the bronze disc. When needed, a new disc, easily slipped onto stem, provides a practically new, tight-seating valve.

Circular Gives The Facts

For complete technical data on both rising stem and non-rising stem patterns . . . size listing, etc., get Circular AD-2340 from your Crane Representative, or by writing to address below.

CRANE® VALVES & FITTINGS

PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill.—Branches and Wholesalers Serving All Areas

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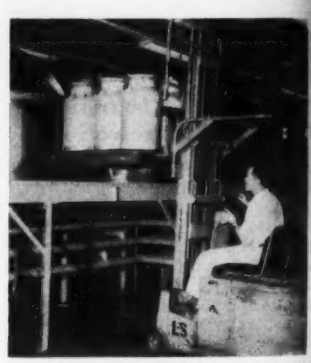
Clean and speedy handling assured in vitamin plant by electric fork-lifts

Problem: In-plant handling was slow at Roche Laboratories Division of Hoffman La Roche, Inc. Hand-operated trucks were used, since highly sanitary conditions, free of fumes or odors, were deemed necessary for production of vitamins made in the plant.

The problem rapidly became acute as sales, production, and shipping volume increased.

Solution: Six electrically powered fork-lift trucks took over the job. Five have 2000-lb capacity; the sixth is rated at 1500 lb.

Trucks handle all incoming and outgoing goods, as well as dry and liquid in-process material. Hand trucks are used only in actual order-picking in warehouse. Ability of the fork-lift trucks to pass under levels as low as 6½ feet is advantageous since it permits



Just one of the handling jobs at Hoffman La Roche. Fork-lift truck places containers of liquid vitamin concentrate next to processing tank on four-foot-high platform

them to enter trailers for loading or unloading operations.

Typical in-process job handled well by one of the trucks is transferring liquid vitamin concentrate from raw storage to stainless-steel processing tanks set on a platform four feet above the ground. Truck picks up a pallet-load of the full milk-can-like containers, carries to tank, lifts and de-

To page 74

NOW! ALL YOUR FUSED QUARTZ REQUIREMENTS FROM 1 SOURCE

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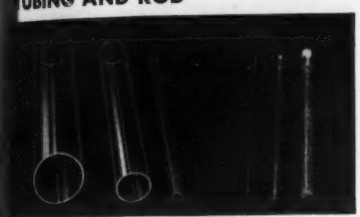

Clear tubing and rod available in standard sizes. Can be secured in random or cut lengths. We will provide quick delivery of specialty work fabricated to your specifications.

FUSED QUARTZ COMPONENTS

High purity—in stock in a wide variety of semi-conductor grade crucibles, boats, test tubes and furnace tubes.

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Check 1641 opposite last page

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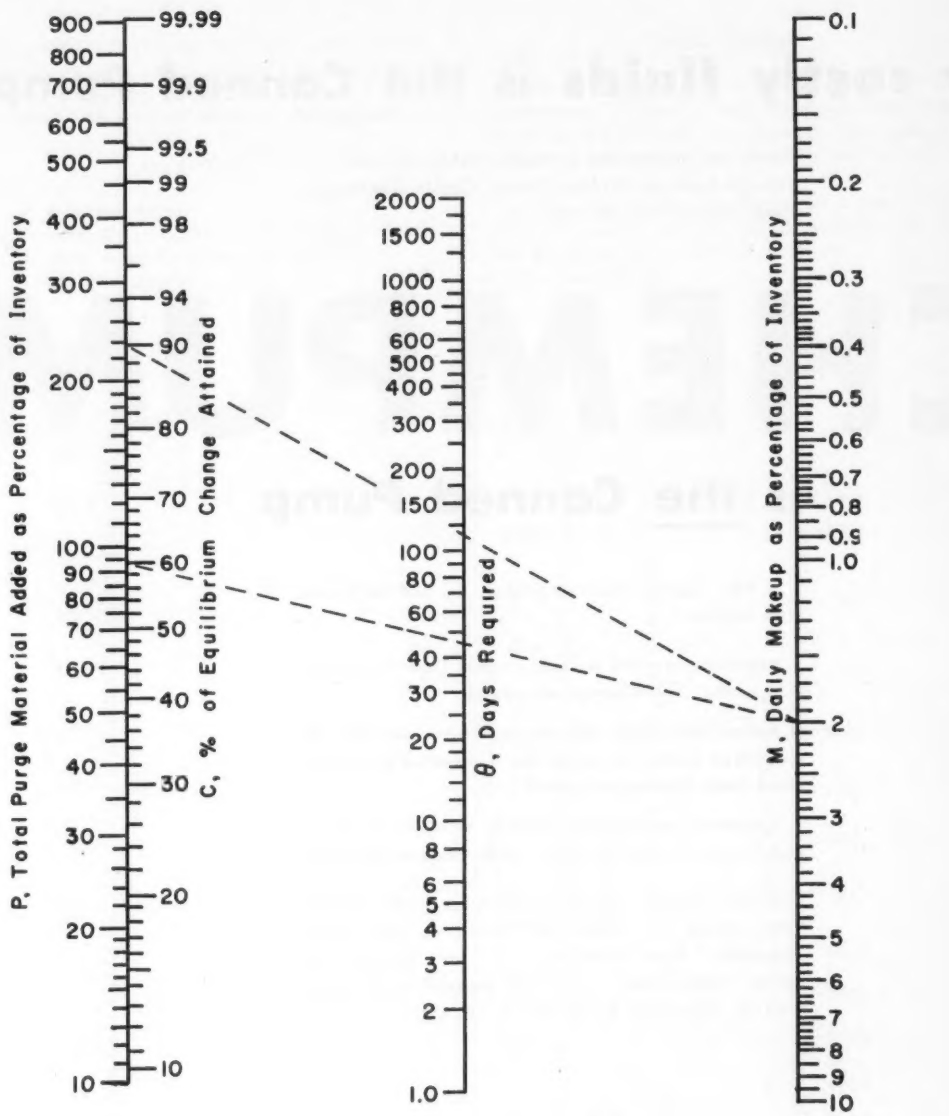
Purge Calculations

From page 71



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for costly fluids is the Canned Pump

Pump and motor are a single, leakproof unit . . . with no seals or stuffing boxes. Costly fluids stay inside where they belong.

CHEMPUMP

is the Canned Pump

. . . the original canned pump . . . the only one that assures:

- **experience-proved design,** evolved from 7 years of field service. **Only Chempump has it!**
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Use *the* canned pump—Chempump—to handle your costly or volatile or toxic, or any other "problem" fluid. *Write now* . . . for "request for quote" data sheet . . . to Chempump Corporation, 1300 E. Mermaid Lane, Phila. 18, Pa.

Chempump

First in the field... *process proved*

Check 1642 opposite last page

From page 72

posits it there. The concentrate is poured into the tanks manually.

Results: Handling is efficient and fast, without fumes and odors. Considerable space savings have been achieved through high-stacking ability of the fork-lifts.

The trucks are particularly impressive in crowded areas. Their rear-wheel drive lets them turn in their own length and high-stack goods in 7½-foot aisles.

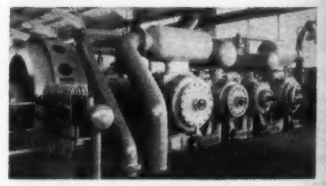
(Model J electric fork-lift trucks are made by Lewis-Shepard Products, Inc., 125 Walnut St., Watertown 72, Massachusetts.)

Check 1643 opposite last page.

Snubbers halt vibrations from 3 big compressors

Units harness pulsing energy of high pressure gases

Problem: Method of eliminating vibrations from multi-gas compressors was sought during new plant start-up at Grace Chemical Company, Memphis, Tennessee. The big 4000-hp units are used to compress mixed gases in this ammonia synthesis plant.

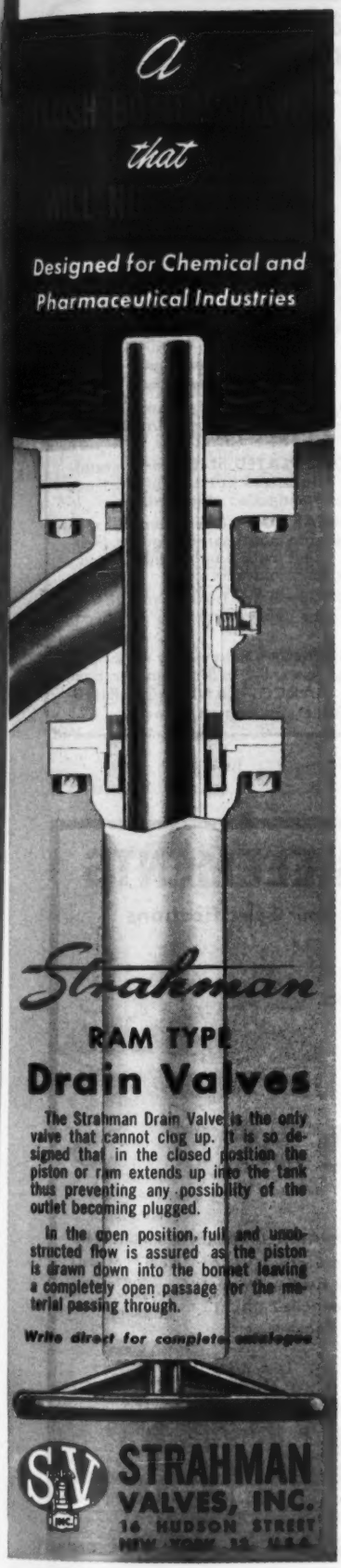


Multi-gas compressor operates essentially vibration-free, thanks to pulsation snubbers (top)

Compression of synthesis gas reaches between 8000 and 10,000 psia, depending upon catalyst condition and cooling water temperature.

Each compressor operates at 327 rpm and simultaneously handles three different gases under varying intake and discharge conditions. Air is compressed from atmospheric to 645 psia in four stages — nitrogen from 15.2 to 330 psia in three stages — and methane from 58.7 to 440 psia in two stages.

To page 76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that
Designed for Chemical and Pharmaceutical Industries
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RAM TYPE
Drain Valves
The Strahman Drain Valve is the only valve that cannot clog up. It is so designed that in the closed position the piston or ram extends up into the tank thus preventing any possibility of the outlet becoming plugged.
In the open position, full and unobstructed flow is assured as the piston is drawn down into the bonnet leaving a completely open passage for the material passing through.
Write direct for complete catalogue
STRAHMAN VALVES, INC.
16 HUDSON STREET

Check 1644 opposite last page

Consistency of Pulp Samples

MALLORY D. DAVIS SR.
Route 1, Box 11A
Wilmer, Alabama

Pulp weight taken off a washer, the weight of the same pulp after being put through a wringer, and consistency of the pulp as it is on the washer can be correlated by the equation:

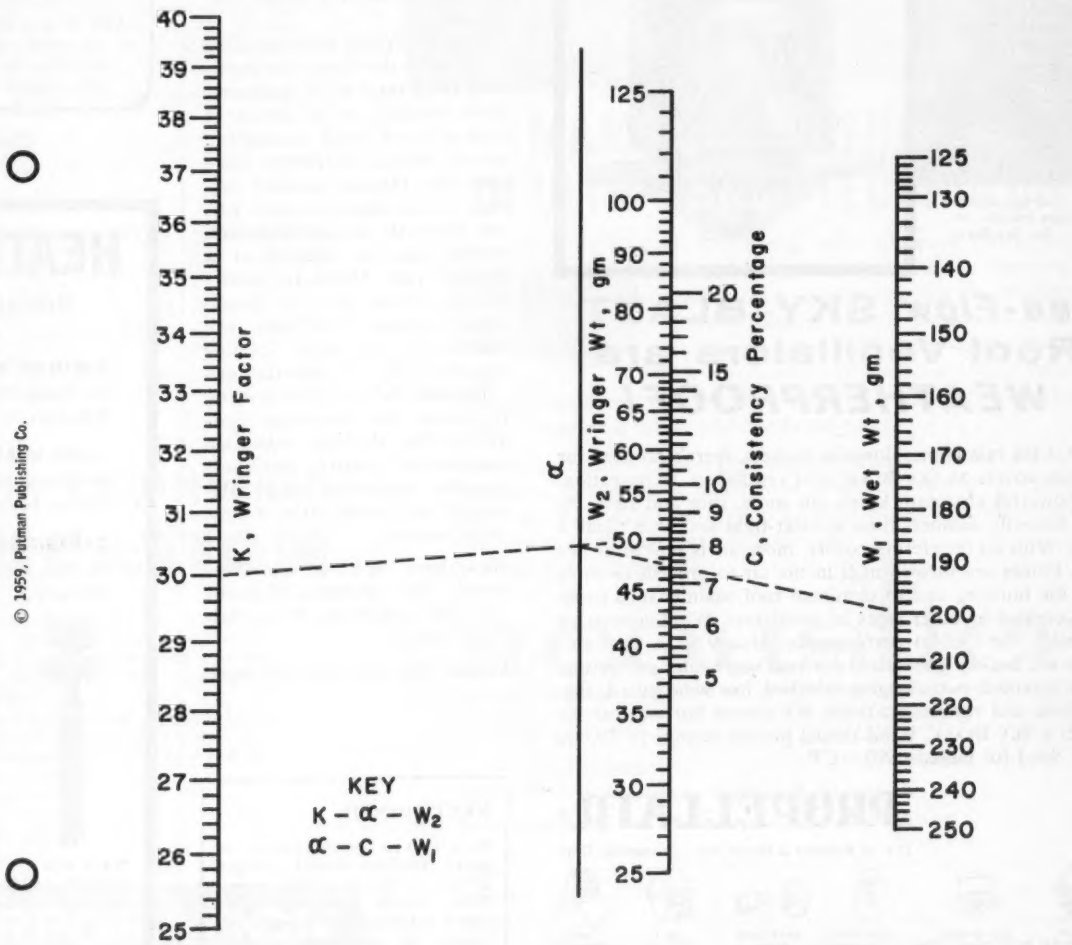
$$C = KW_2/W_1$$

where,
- K = wringer factor
- W_2 = wringer weight, after wringer
- W_1 = wet weight, before wringer
- C = consistency, %

Typical Example

With a wringer factor of 30, what is the consistency of pulp if the weight of this pulp is 200 g before it is put through the wringer and 50 g after it is put through the wringer?

Connect K = 30 with W_2 = 50. Connect the point of intersection on the α scale to 200 on the W_1 scale. Intersection with the C scale is 7.5% consistency.



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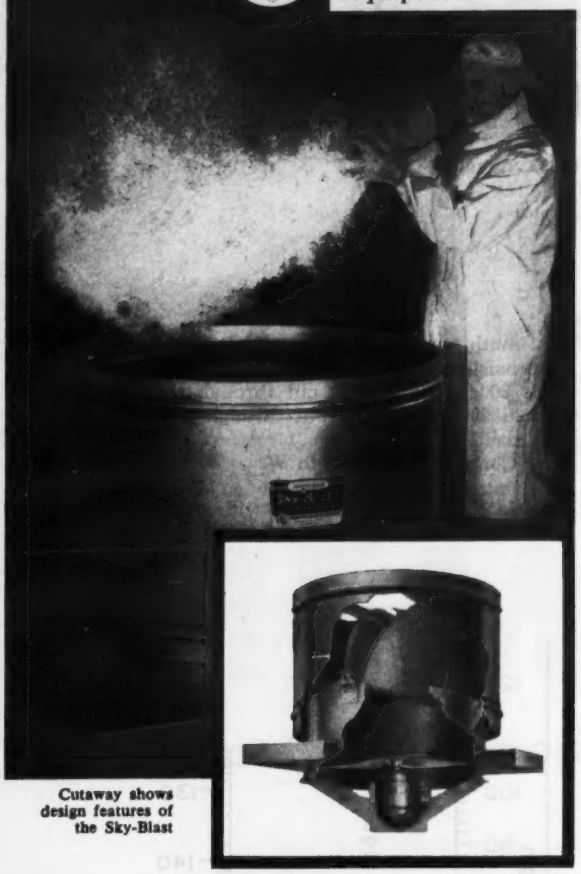
PROPELLAIR®
Ventilating Equipment



Cutaway shows design features of the Sky-Blast

Free-Flow SKY-BLAST® Roof Ventilators are *WEATHERPROOF!*

Even if the rain comes down in buckets, there's no need for weather covers on SKY-BLAST roof ventilators. In operation, the powerful airstream keeps out snow, rain and sleet. At rest, butterfly dampers form a water-tight seal, won't leak a drop. With no interfering covers, more air is moved at less cost. Fumes are thrown high in the air to prevent re-entry into the building and to eliminate roof maintenance problems created by other types of ventilators. Wind velocity or direction can't affect performance. Heavy gage steel surfaces are hot-dip galvanized for real sou'wester protection. With patented, non-clogging rainshed, low wind guard, rugged base and condensate drain, it's always fair weather beneath a SKY-BLAST. Wind tunnel proven ratings to 78,000 cfm. Send for bulletin 680—CP

PROPELLAIR®
Div. of Robbins & Myers, Inc., *Springfield, Ohio*

DIRECT CONNECTED · SKY-BLAST® ROOF VENTILATOR · TUBEAXIAL and VANEAXIAL · EXTENDED SHAFT · BELT DRIVEN · MAN COOLERS

MOVING AIR IS OUR BUSINESS®

Check 1645 opposite last page

NEW SOLUTIONS

From page 74

Solution: Snubber experts were called in to conduct a pulsation survey on the compressor piping. Burgess-Manning engineers recommended that pulsation snubbers be installed wherever maximum pulsation amplitude reached 5.0 per cent of the absolute line pressure.

After a thorough study of the survey results, the following "bottles" (expansion chambers) on each of the three compressors were replaced with pulsation snubbers: Air compressor — second stage discharge, third stage suction, third stage discharge, fourth stage suction, fourth stage discharge. Nitrogen compressor — second stage discharge, third stage suction, third stage discharge. Methane compressor — second stage discharge.

Nine snubbers were installed on each of the three compressors, for a total of 27 snubbers. Units consist of a series of chambers, each containing ported tubes. Snubbers harness the intense pulsing energy of the high-pressure gas, cut down its acceleration and permit gas to expand at a gradual rate. Units are available in either two- or three-stage design. Snubbers are engineered to meet specific requirements of installation.

Results: After slight bracing revisions, the snubbers provided the desired vibration dampening control. Snubbers operate smoothly and efficiently and need little, if any, maintenance.

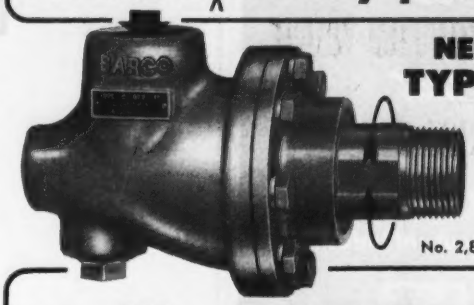
(Snubbers were manufactured by Burgess-Manning Co., 9207 Sovereign Row, Dallas, Texas.)

Check 1646 opposite last page.

NEXT MONTH

Accurate proportioning of paper machine furnish components is a key to quality paper. Next month you will learn about International Paper Co.'s system for automatic proportioning of pulp stocks and chemical additives.

Better
Need a rotary joint?



NEW TYPE C

Patent No. 2,836,439

-it's BARCO!

For countless applications, Barco's new Type C Rotary Joint will give you the best operating records you've ever had—*and for LESS COST!*

"CRACK-FREE" CHROME PLATED SLEEVE—A standard Barco feature. Minimizes corrosion, friction, wear. Stainless steel spring also standard.

RESISTS SEAL RING BREAKAGE—The spherical seal ring is under compression, not *tension*, loading. Self-adjusting for wear. Seal withstands shock loads and alternating hot and cold service.

WIDE SPACED BEARINGS—Two, instead of one . . . increased bearing area. No lubrication required. Lowest friction.

200 P. S. I. STEAM RATING—Heavy duty service at *no extra cost.* Eight sizes, ½" to 3". *Send for new Catalog 310 today.* **BARCO MANUFACTURING CO., 537F Hough Street, Barrington, Illinois.**

Check 1647 opposite last page

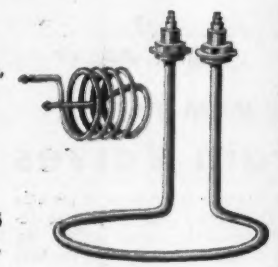
HEATING ELEMENTS

Designed to *Your* Specifications

TUBULAR HEATERS for Tanks, Kettles, Baths, Extruders

STRIP HEATERS for Ovens, Dryers, Process Equipment

CARTRIDGE HEATERS for Dies, Molds, Platens, Defrosting



OIL & WATER IMMERSION HEATERS The Complete Line of TRENT Metal Sheathed Heating Elements Assures On-the-Spot Controlled Heat to Your Most Exacting Requirements.

WRITE FOR BULLETIN 74-TE.

TRENT INC.
Electrically Heated Industrial Equipment
235 LEVERINGTON AVE., PHILADELPHIA 27, PA.
In Canada Supreme Power Supplies Limited, Toronto 14

Check 1648 opposite last page

Special phenolic lining stops catalyst attack in 55-gal steel drum

Problem: Packaging of catalyst component of urea-formaldehyde-resin adhesive system caused trouble for National Casein of New Jersey because of compound's reaction with steel.

Originally, National's plant at Riverton, N. J., used wooden barrels for shipping catalyst and adhesive, but leakage frequently occurred. Barrels were heavy and unattractive. Customers disliked them because pumping equipment could not be attached to remove contents.

Unlined steel drums replaced barrels for shipping adhesive. But these proved unsuitable for shipping the catalyst.

Solution: Fifty-five-gal drums with specially compounded, pigmented phenolic lining were obtained. Catalyst thus is contained in a continuous, tightly bonded internal "envelope."

Results: Catalyst reaction with steel has been eliminated. A positive seal against loss of gaseous ammonia has been provided. Economy has been achieved because drums, although used only once for shipping catalyst, sometimes are re-used for shipping adhesive.

(Phenolic-lined drums are development of Container Div., Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pa.)

Check 1649 opposite last page.

Heating problems and how they can be solved with single and multiple boilers are subject of 16-page bulletin. Full-page 8 x 10" photographs illustrate high and low pressure systems in numerous plants. Bul 491—Vapor Heating Corporation, Main Office, 80 East Jackson Blvd., Chicago 4, Ill.

Check 1650 opposite last page.

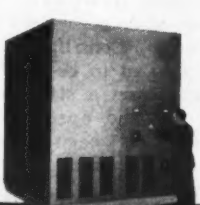
PREFERRED

Sel-Rex®

CUSTOM ENGINEERED

RECTIFICATION

- *Germanium*
- *Silicon*
- *Selenium*



Of the thousands of Sel-Rex Rectifiers in use, a large percentage are "repeat orders"—units purchased only after an original installation had thoroughly proven itself.

Our users include the country's foremost electrical and electronic concerns* — companies best qualified to evaluate rectifier equipment.

**names on request*

Send for FREE "GUIDE" to Industrial Rectifier Equipment.

Rectifier Division

SEL-REX CORPORATION

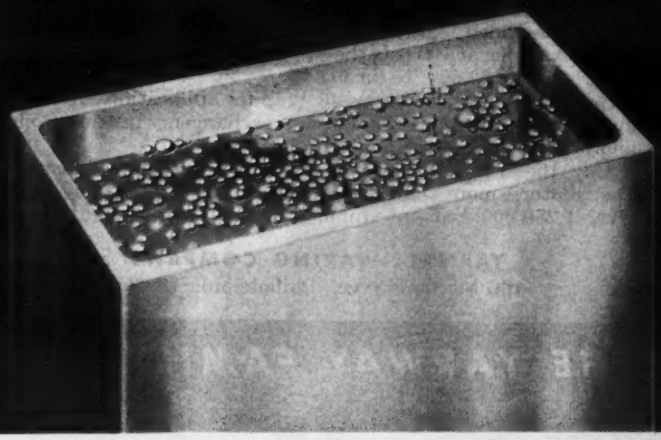
NUTLEY 10, NEW JERSEY

Representatives in Principal Cities

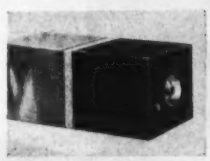
"Complete Semiconductor Power Conversion Systems for any AC to DC application"

Check 1651 opposite last page

ONLY ACOUSTICA ULTRASONIC CLEANERS HAVE MULTIPOWER!



MAJOR BREAKTHROUGH IN ULTRASONIC TECHNOLOGY!



In determining which ultrasonic cleaner to buy, remember that all ultrasonic cleaners are not alike. There is variation in uniformity of cavitation. There is variation in the transducer — and the transducer is the heart of an ultrasonic cleaner. The Multipower transducer developed by Acoustica research, multiplies the power and efficiency of ultrasonic action. Cleaning is faster, labor costs are lower.

Acoustica ultrasonic cleaners are engineered and produced to the finest standards, unequaled in quality and value. Off-the-shelf in capacities from 1 to 75 gal. or custom built to 5000 gal. Expert Acoustica engineers can help you with your cleaning problems.
Send for further information.

acoustica

Leader in research and development of ultrasonic systems

Los Angeles and New York

Acoustica Associates, Inc.
Dept. CP, 26 Windsor Ave., Mineola, N. Y.

Send information describing advantages of Acoustica ultrasonic cleaners.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

Check 1652 opposite last page

SERIES 40 GOBBLES UP EXTRA HEAVY CONDENSATE LOADS

This "thirsty" Yarway Impulse Steam Trap gives you all the well-known Yarway advantages like *quick heat-up, even temperatures, small size, good for all pressures, non-freezing*—PLUS the added feature of *huge capacity.*

For example, at 100 psig the ¾" size will handle 5600 lbs/hr; the 2½" size, 62,000 lbs/hr.

Specify the Yarway Series 40 Trap for applications on large autoclaves, cooking kettles, heat exchangers, heating coils and other places where loads are heavy.

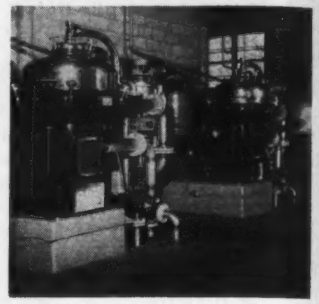
Buy the Yarway Series 40 from your nearby Industrial Distributor—more than 270 stock and sell the Yarway line. Over 1,250,000 Yarway Impulse Steam Traps already sold.

YARNALL-WARING COMPANY
100 Mermaid Ave., Philadelphia 18, Pa.

SERIES 60—normal needs, pressures to 400 psi, 6 sizes. **SERIES 120**—normal needs, pressures to 600 psi, 6 sizes. **SERIES 40**—for extra heavy loads, 5 sizes. **NO. 30**—for extra light loads (½" only). **INTEGRAL STRAINER**—highest pressures and marine use, 6 sizes.

YARWAY | *impulse® steam traps*

Check 1653 opposite last page



Best economy found separating starch with centrifugals

First and operating cost considered in choice

Problem: Concentration of middlings was an important consideration in economics of Corn Products' modern starch preparation system. Middlings stream is wash water from second-pass starch separators. It contains 8 oz/gal of solids consisting of about 6% protein.

Solution: After careful economic evaluation of available equipment Corn Products chose five disc-type centrifuges as middlings concentrators. Flow is fed continuously into bowl rotating at approximately 4800 rpm and becomes separated into two fractions by centrifugal force. Concentrated stream is discharged through nozzles in periphery of the bowl. The lighter fraction passes toward the center of the bowl where it is discharged.

Concentrate stream contains 50-52 oz/gal solids. Lighter effluent has a solids content of 100-150 grains/gal. This low-solids-content water is used for counter-current washing in early stages of the separation process, finally ending up as corn steep water.

Results: Centrifugals used have proven to be most economical from a standpoint of first cost and operating cost. Service has been relatively maintenance free and efficient.

(QX 212 starch separator is a product of De Laval Separator Company, Poughkeepsie, New York.)

Check 1654 opposite last page.

THAT'S INTERESTING

A day well spent

Gifted high school pupils of Northern California now have chance to spend a day working at the laboratory bench with scientists who are active in the field pupil hopes to enter after college. *Shell Development Co.* is taking part in program, sponsored by Northern California chapter of Instrument Society of America.

Built-in sipping

Sipping beverages has been made easier with a plastic cup featuring a built-in straw. Made of a rigid polyethylene produced by *Celanese Corporation of America*, cup can safely be sterilized. It is tough enough to withstand such abuse as being thrown on floor without cracking or breaking. Cups come in red, blue, and yellow, hold eight oz.

For more information on product at right, specify 1655 see information request blank opposite last page.

Which of these 3 products and services can you use from BECCO?

New Cold Caustic Bleach Process

Looking for a way to use greater amounts of low-cost, more plentiful pulp—without capital investment for bleach equipment? Then let a Becco Sales Engineer show you our new technique* which allows you to bleach in the same equipment regularly used for the manufacture of cold caustic pulp.

In this new process, peroxide bleach liquor is added at the Bauer Refiner, and bleaching occurs during the refining operation. Bleach response depends on refiner densities.

Up to 20 points brightness increase has been obtained in commercial operations to date, and with no additional steam costs, no holding time, and no excessive chemical costs.

Becco can assist you immediately in setting up a production run and evaluating results. First step: use the coupon to let us know you're interested.

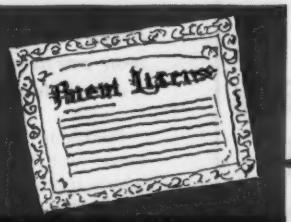
*—Patent Pending

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York
Dept. CP-H

Gentlemen:
Please have a Sales Engineer give me more information on Becco's Cold Caustic Bleach Process.

NAME_____
FIRM_____
ADDRESS_____
CITY_____
ZONE____ STATE_____



"Enclosing $1.00— Send Patent License"

Well, perhaps there's a little more to your gaining use of Becco patents than just mailing your dollar in, but not much more. And certainly, no more money. The $1.00 really does cover it.

Becco has lots of patents, granted as a result of innovations in the use of Hydrogen Peroxide and other Peroxygen chemicals developed in Becco's Research Laboratories. But they don't do us a whole lot of good locked tightly in our safe. So, we long ago adopted the following policy:

If one of our patents can help you, we'll be glad to license the rights to you **perpetually**, for just one dollar. You get a nice certificate, incidentally, to cover the legalities, but more important—you also get free our complete engineering help in setting up your process, handling the material, maintenance, etc., etc.

What do we get? You as a customer—we hope—but there's no obligation on your part. Just seems to work out that way, though—when we know enough about a particular peroxygen to hold a patent on its use, chances are we've also learned enough to produce it purer than anyone else. You benefit from this; we do, too.

Use the coupon below to ask for a Sales Engineer—or our list of patents—that may help you solve an important problem.

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York
Dept. CP-F

Gentlemen:
Please send your list of patents available on the use of
☐ Hydrogen Peroxide
☐ Peroxygen Chemicals
☐ Persulfate Chemicals
☐ Please have a Sales Engineer call.

NAME_____
FIRM_____
ADDRESS_____
CITY_____
ZONE____ STATE_____

Problems in handling Hydrogen Peroxide

?

Becco's Four-Fold Engineering Service Program—offered free—includes:

1. Comprehensive survey of your facilities.
2. Specific proposal with recommendation of proved equipment and where it is obtainable.
3. Installation supervision by Becco.
4. Periodic inspection and permanent service.

Can you use this free Becco help, based on more years of experience with bulk handling of H_2O_2 than any other manufacturer? Use the coupon to let us know.

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York
Dept. CP-B

Gentlemen:
Please tell me more about your Four-Fold Engineering Service.

NAME_____
FIRM_____
ADDRESS_____
CITY_____
ZONE____ STATE_____

PUMPING IDEAS

Possible only with a

SIGMAMOTOR PUMP

Move Corrosive Liquids

Material being pumped never comes in contact with pump mechanism. Wave-like motion of steel fingers forces material through Tygon tubing. By changing size of tubing, capacity can be increased or decreased. Pump housing opens for removal and insertion of tubing.

Pump 2 or 3 Different Liquids Simultaneously

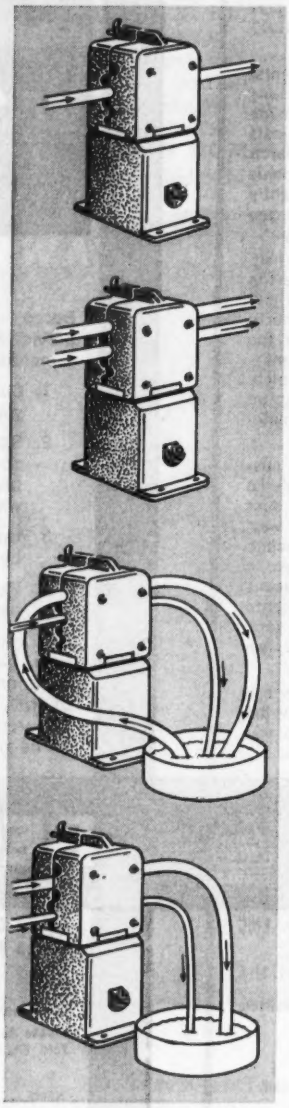
Some models will accommodate up to four tubes so that four different liquids can be passed through the pump at one time without danger of contamination.

Feed and Mix

One or more tubes can be feeding material to a mix while a larger tube is recirculating the liquid to produce agitation and thorough mixing. Viscous materials can be pumped without danger of gumming or plugging. Remove tube and pump is clean.

Meter Additives

One or more additives can be pumped to a solution in the exact amount desired by selecting the correct size of tubing and regulating pump speed. Various controls can be incorporated to close valves ahead of pump.



Capacities from 0.5 cc. per min. to 4.5 G.P.M.

Write for complete information on sizes and capacities.

SIGMAMOTOR, INC.

18 N. Main Street • Middleport, N. Y.

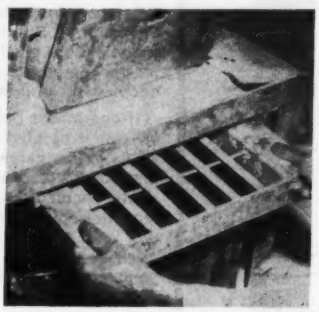
Check 1656 opposite last page

NEW SOLUTIONS

Magnetic grate extracts iron-particle impurities from resins

Problem: Iron particles were infiltrating into resin when metal drums containing it were opened. This caused precision-machine damage and shutdowns at Technical Tape Company, Long Island City, New York.

Solution: A magnetic grate was installed where resin would filter through immediately after being chopped and formed into small pellets. This occurs prior to resins passing on to other precision machines.



Magnetic grate is inserted so that resin particles will pass through, and iron particles will be removed

Magnetic grate is composed of multiple Alnico V-powered magnetic tubes arranged so that free-flowing dry material passing through is exposed to magnetic fields.

Results: Estimated savings per year in machinery damage is $2000. In addition, $1000 per year in cost of machine shutdowns is saved.

(Magnetic grate is product of Eriez Manufacturing Company, Erie 6, Pa.)

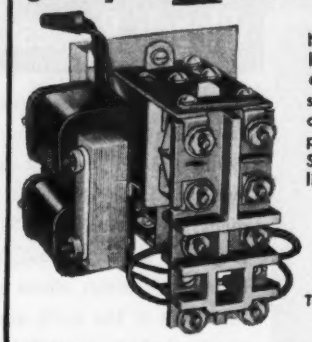
Check 1657 opposite last page.

Pneumatic conveying system and how it helped modernize Union Starch's material handling routine, cut handling costs, and provided for plant expansion is described in four-page bulletin. Photographs and drawing compares old and new starch handling routes. Bul ER-2046-1—Fuller Co., Catasauqua, Pa.

Check 1658 opposite last page.

WARRICK Floatless Electrode Type LIQUID LEVEL CONTROLS . . .

give you all these advantages!



No moving parts in the liquid • Easy to install • No adjustments necessary • Unaffected by acids or caustics • Unaffected by pressure or temperature • Standard 2&3 pole units listed by U/L

Write for 32-page Catalog which gives complete specifications

Two pole control shown at left

YOU CAN USE OUR CONTROLS FOR:

- Single & multiple pumps
- Motor & solenoid valves
- High & low cutoffs & alarms
- Condensate contamination
- Storage tanks
- Volumetric Metering
- Waste sumps

Special controls to custom requirements

CHARLES F. WARRICK CO.

1964 W. Eleven Mile Road, Berkley, Michigan
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Check 1659 opposite last page

For Accurate TEMPERATURE RECORDS at MODERATE COST

RANGES AVAILABLE
Temperature Range
One Rotation of Chart
−30° to +120°F. 7 Days
−30° to +120°F. 24 Hours
−30° to + 50°F. 24 Hours
−20° to + 40°F. 7 Days
−10° to + 50°F. 24 Hours
−10° to + 50°F. 24 Hours
10° to 90°F. 24 Hours
30° to 60°F. 7 Days
40° to 100°F. 24 Hours
40° to 100°F. 24 Hours
50° to 130°F. 24 Hours
60° to 90°F. 8 Hours
60° to 90°F. 24 Hours
70° to 130°F. 24 Hours
−25° to + 10°C. 24 Hours
5° to 40°C. 24 Hours
tempscribe

Use TEMPSCRIBE Recorders

BULB-TYPE (illustrated)—*For recording temperatures at a distance*
BI-METAL TYPE—*For recording temperatures in surrounding air*

- Portable—easily carried. Can be set on flat surface or hung on wall.
- Spring-wound instrument-type clock: 3 standard movements—8 hours, 24 hours or 7 days.
- Instrument measures 4½" x 5½" x 7½"; uses 4¼" diameter charts.
- Chart graduations easy-to-read; spaced uniformly over full range.
- Pen and its actuating components are in door. Doors are completely interchangeable to convert to any temperature range, or from bi-metal type to bulb-type.

Also available: (1) Interchangeable door with electro-magnetic armature to record running time of motors, burners, solenoid valves, etc. (2) Two-pen doors for recording temperature and electrical operation on same chart.

Write for Leaflets 786 and 872

BACHARACH INDUSTRIAL INSTRUMENT CO.
200 N. BRADDOCK AVE. • PITTSBURGH 8, PA. T-25

Check 1660 opposite last page

Endura Corporation is a major supplier of pressure-sensitive paper tape backings and other impregnated paper products. Well known in the pressure-sensitive tape industry, the company bases more than 95% of its coating and saturating compounds on latex. Here is where . . .

Butadiene-based Polymers Help 'Tailor' Specialty Papers

THEODORE W. WETT, Associate Editor
with RICHARD C. HOCH, Technical Director
Endura Corporation, Quakertown, Pa.

Impregnating kraft paper for pressure-sensitive, printing, and industrial tapes at Endura Corporation. Synthetic latices give paper desired qualities of strength, flexibility, and good aging

Top quality paper tape owes many of its outstanding characteristics to synthetic rubber latices. At Endura Corporation, impregnated paper products for pressure-sensitive and industrial tape uses, are treated with impregnants based on latices of butadiene-styrene (Pliolite) and butadiene-acrylonitrile (Chemigum).

Chemigum latex furnishes toughness, tear resistance, flexibility, and good light-aging properties. Oil resistance and strength are high. Pliolite latex serves as a reinforcing agent and provides required tensile strength and modulus.

While latices are picked primarily for properties imparted to impregnated paper, these two showed additional advantages in processing. Both have mechanical stability needed to resist degradation when excess latex is squeezed from paper and circulated for reuse. They exhibited ease of handling in processing and full compatibility with other process materials.

In addition to latex, a typical impregnating solution contains pigment, antioxidant, reinforcing agent, stabilizer, and perhaps antifoam and curing agents.

In production of impregnated paper, Kraft stock is fed through a saturating bath containing latex. Bath is supplied by gravity from storage tanks located on a mezzanine above saturating unit. As paper leaves bath, it passes between squeeze rolls for removal of excess compound.

Impregnated paper is dried in hot-air circulating ovens in which temperature and humidity are under exacting control. Following initial drying operation, paper is festooned to permit complete drying before wind-up. This also permits removal of completed rolls without interrupting continuous production.

Some latex compounds contain curing agents to impart additional strength and delamination resistance. Paper treated in this manner is cured in final stages of drying oven.

Tensile strength testing is among quality control procedures. Others include stretch, delamination resistance, tear and bursting strength, porosity, caliper

Development of Impregnation

Impregnation is an ancient art. Egyptians dipped cloths in bitumen to preserve their honored dead after entombment. Subsequent history offers many examples of impregnation to increase strength and durability of materials.

Natural rubber latex was first rubber polymer to be used as a saturant for paper. While this latex imparted excellent tearing strength and resilience to paper, large particle size limited penetration. Inherent tackiness unless cured, severe degradation at high temperatures, and pure resistance to oils were serious disadvantages. Since all this latex had to be imported, supply was unstable.

Neoprene overcame natural rubber's poor resistance to oils, and more uniform, smaller particle size aided penetration into paper. A serious objection to its use in paper was poor aging attributed to evolution of hydrogen chloride causing a tendering of the cellulose. An acid acceptor such as zinc oxide, and a good antioxidant helped minimize cellulose degradation.

Butadiene-based latices provided the greatest advance in paper impregnation. They imparted better flexibility and internal bonding strength, as well as being easier to compound and handle in the saturating operation. Supply was uniform and price lower than

oust it with a Dow Corning SILICONE DEFOAMER!

When foam moves *in*, efficiency moves *out* . . . production goes down! Costs go up! If foam is hogging space in your plant, knock it down with Dow Corning SILICONE DEFOAMERS . . . most versatile and effective foam killers made!

1 oz kills foam in:

250,000 lb vat dye solution

125,000 lb asphalt

62,500 lb hypo fix and film developer

FREE SAMPLE! Make your own test. Return coupon below for generous *trial sample* of a Dow Corning SILICONE DEFOAMER. No obligation, of course.

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

3217

NAME

TITLE

COMPANY

CITY ZONE STATE

My foamer is

Oil system

Aqueous system

Food products

Other

Check 1661 opposite last page

other types of latex on the market.

Endura has a forty-year record of quality production of impregnated papers for industrial use. Management believes that Pliolite and Chemigum latices have been of real value in development of the Endura product line.

(For more information on Pliolite and Chemigum latices contact The Goodyear Tire & Rubber Co., Akron 16, Ohio.)

Check 1662 opposite last page.

Announce 99% pure ytterbium metal

Ytterbium metal 99% pure, in lump or ingot form or fabricated shapes, is now available. The element presents several anomalous properties in the rare earth sequence, such as lower melting point and density. These properties, coupled with resistance anomalies, suggest use for semi-conductor applications, electronic devices, new alloy compositions.

(Product of Research Chemicals, Inc., division of Nuclear Corporation of America, 170 W. Providencia, Burbank, California.)

Check 1663 opposite last page.

Small particles, no water in latex copolymer

Uses: In making of latex paints.

Features: Latex copolymer has small particle size and high water resistance. This results in latex paints with high pigment concentration, thus improving both wet and dry hiding while maintaining good film integrity, washability, and smudge resistance.

Description: Acrylic polyvinyl latex copolymer has adhesion on smooth, glossy, and textile surfaces. Properly formulated paints utilizing product show no pH drift on aging.

(COFAR is product of Farnow, Inc., 4-83 48th Ave., Long Island City, N.Y.)

Check 1664 opposite last page.

CPH-4

Diglycol Laurate Se

for use as
Emulsifier
Anti-foamer
Carrier
Solvent
Wetting Agent
Detergent
Solubilizer
Lubricant
Plasticizer
Emollient

for use in production of
Paper
Cosmetics
Textiles
Lubricants
Pharmaceuticals
Chemical Specialties
Paint
Cleaners
Metals
Polishes

check these features
- Anionic
- Water dispersible
- Self-emulsifying
- Wide compatibility
- Light in color
- Slightest odor

THE FLAME AND THE FLASK Symbol of Quality

Ask for information about other Fatty Acid Esters available for specific applications.

The C. P. Hall Co.
CHEMICAL MANUFACTURERS
5245 W. 73rd St., Chicago 38, Illinois
NEWARK • AKRON • CHICAGO
MEMPHIS • LOS ANGELES

Check 1665 opposite last page

Plasticizers for PVC have built-in stabilizer

Prevent resin degradation by heat and light

Uses: Primary plasticizers for polyvinyl chloride resins. As combination stabilizers-plasticizers, the materials are applicable to wide range of vinyl resin formulations and products, such as hose, toys, flooring, packaging materials, film, and foam.

Features: Combine the excellent stabilizing properties of epoxy fatty acid esters with the good over-all plasticizing properties of the phthalates. Highly compatible with PVC at high-concentration use levels. Show no bleed after prolonged exposure to ultraviolet or diffused light.

Description: These epoxy plasticizers are alkyl epoxyhexahydrophthalates. They are prepared by epoxidation of the corresponding unsaturated tetrahydrophthalic acid esters with preformed peracetic acid . . . or by in situ techniques using hydrogen peroxide.

(Development of Becco Chemical Division, Food Machinery and Chemical Corporation, Station B, Buffalo 7, New York.)

Check 1666 opposite last page.

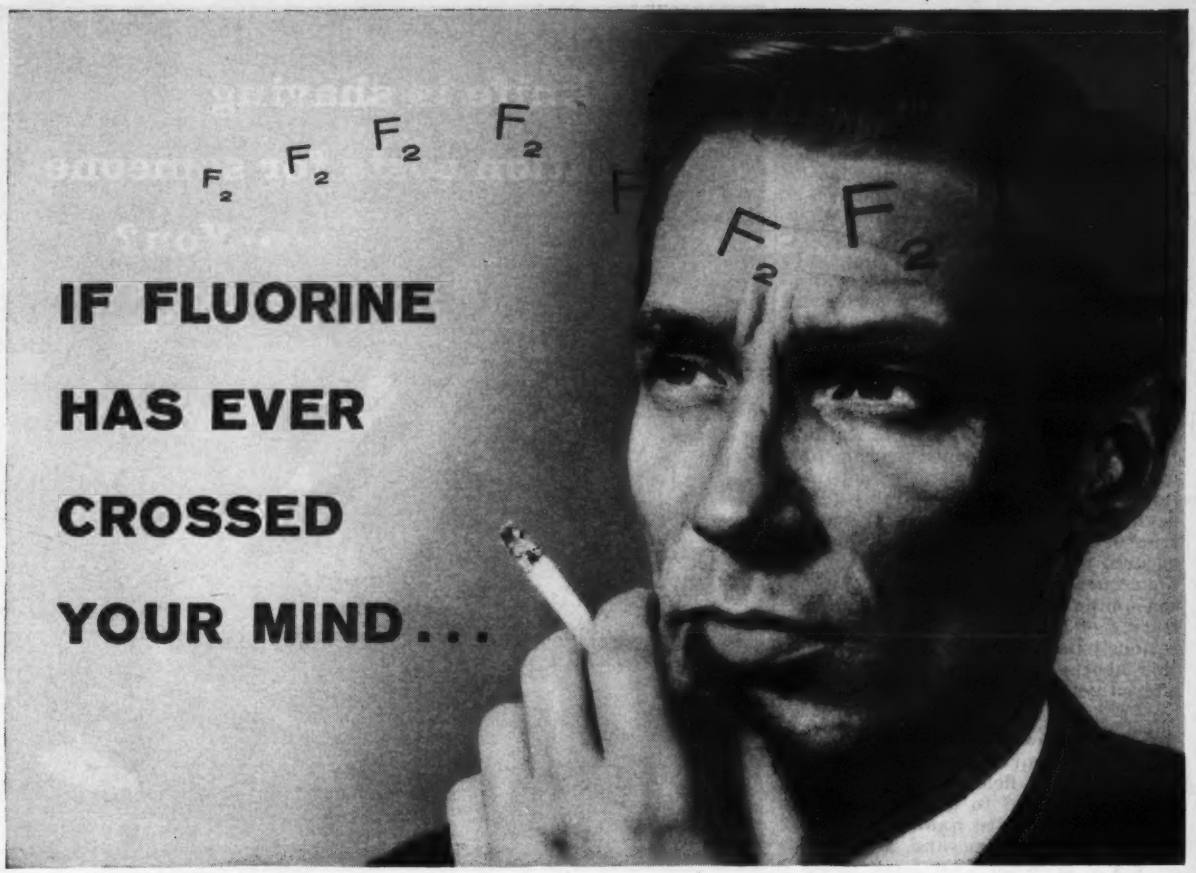
Next month . . .

FEATURING CHEMICAL MATERIALS

In the June issue, CHEMICAL PROCESSING magazine will again feature the chemical materials section. Highlighting this feature will be an exclusive report on Du Pont's procedure for evaluating new chemicals being offered to them as possible raw materials.

Our yearly listing of new development scale materials, a prominent part of earlier features, will again be presented . . . with CP's comprehensive "Use Index" for rapid location of compounds of interest.

You'll want to be sure to see this annual roundup of chemical products now available for evaluation.



Now's the time to try it!

Time was when the thought of using elemental fluorine would be dismissed quickly. Both handling and availability presented major problems. But tremendous progress has been made in both these areas. And today, *if you've ever thought about using fluorine, now's the time to investigate!*

As the leading producer of fluorine, General Chemical has played a major part in these developments. General developed the first and only practical method for shipping fluorine *as a liquid* in bulk—making it available in commercial quantities for the first time . . . making fluorine easier and more economical to use, handle and store. General also provides a convenient source of supply for fluorine gas in cylinders. And, to enable laboratory researchers to work with fluorine more safely and more easily, General has developed and tested a reliable new system for handling fluorine in the laboratory. A comprehensive, illustrated data sheet on this development is available, complete with schematic diagrams and directions.

As a result of these significant advances, you can now experiment with fluorine in the laboratory more conveniently and at minimal risk. If fluorine offers profitable avenues of investigation or commercial application, and you need elemental fluorine in large quantities, General Chemical is ready to meet your requirements.

For further information, just write or phone. Ask for our comprehensive technical bulletin, "Fluorine," or "Handling Elemental Fluorine in the Lab."

First in fluorine chemistry

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

Check 1667 opposite last page

SHEDDING NEW LIGHT ON PRECOAT FILTRATION PROBLEMS

It is generally known in engineering circles that the theory of filtration has not yet reached the point where flow rates and the degree of clarification can be predicted accurately. Plants using supposedly identical systems to filter raw sugar liquors, antibiotic fermentation brews, varnishes, or whatever, will experience extremely wide divergences in filtration rates.

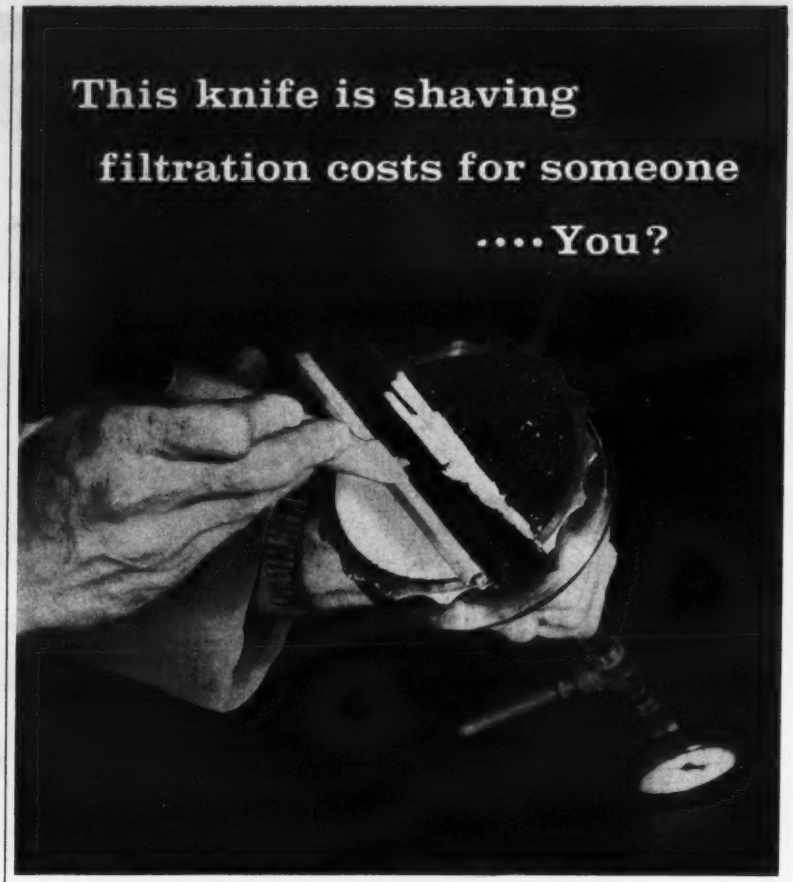
Accurate determinations of filtration costs and the sizing of equipment can thus be made only by actual filtration tests. While the well-known Dicalite Bomb Filter has provided a means of investigating batch pressure filtration operations, no comparable test device has been available to industries using or planning to use rotary vacuum (or pressure) precoat filters. Consequently, the necessity for time consuming and expensive pilot plant testing of precoat filter systems has seriously impeded the introduction of this labor-saving equipment where it offered potential cost reductions.

Now, after several years of laboratory development and field testing, we are proud to announce that Dicalite has developed a precise and accurate Precoat Test Leaf, available for general use, which allows study of all the process variables of precoat filtration in the laboratory. Drum speed, grade of filteraid, amount of filteraid and depth of cut can all be checked out rapidly and easily. The results obtained, and predictions based thereon, correlate closely with actual plant production results.

Our own tests and field experience indicate that many precoat filter operators can cut their filteraid costs by at least 20% – and in some cases savings up to 50% are possible even in "blue chip" concerns. These savings result either from a change in the grade of filteraid employed, or from adjustments in one or more operating factors which could not be accurately checked in large-scale production units.

If you have a potential precoat filtration application, or if you presently operate a precoat filter and want a quick test of the possibility of cutting operating costs, we suggest that you get in touch with your Dicalite sales engineer. We are not in the business of selling test units, but we will be glad to run tests for you, or to assist you in obtaining a Dicalite Precoat Test Leaf for your own use.

P. W. Leppla, Technical Director



Here, a problem in rotary vacuum precoat filtration is being worked out with a new laboratory-scale testing device. And, when the tests are completed, *all* the answers for optimum filtration will be there ... maximum through-put at desired clarity, with the most economical dosage and grade of filteraid. This new test leaf, a product of Dicalite research, is the only such device which provides the all-important feature of precise and accurate shave-off control. Hence, it can determine, in the laboratory, the effects of all the process variables – with only a few gallons of process liquor – in just a few hours – with an accuracy never before possible even in pilot plant tests.

Tests made with this Dicalite Precoat Test Leaf have already effected filtration economies for many Dicalite customers, coast to coast. If you would like further information on this device, we will be glad to send you an illustrated reprint of a paper read before an A.I.Ch.E. meeting and later published in a leading chemical journal. Just write us, or ask your local Dicalite sales engineer.

Dependable GLC GREAT LAKES Dicalite DIATOMACEOUS MATERIALS

Dicalite Department, Great Lakes Carbon Corporation
612 South Flower Street, Los Angeles 17, California

Among the DIATOMS shown here:
SYNEDRA
NAVICULA
CYMBELLA
SURIRELLA
COSCINODISCUS
ACTINOPTYCHUS
EPITHEMIA
EUNOTIA

Check 1668 opposite last page

CHEMICAL MATERIALS

Fine-particle clays good for reinforcing rubbers of bright colors

Have GE brightnesses from 80 to 87 percent

Uses: Reinforcing natural and synthetic rubber polymers, particularly where light, bright colors are required.

Features: GE brightnesses run from 80 to 87% for the series of clays.

Description: Polyfils are fine-particle water-fractionated clays. Specific gravity of each is 2.60, max moisture 1.0%, % silica 44-46, % alumina 37.5-39.5, % titanium dioxide 1-2, and no manganese. Ignition loss runs from 13.9 to 14.2%. Other properties are given in table below.

	Polyfil Type		
	C	X	F
Screen residue, maximum			
% 200 mesh	0.03	0.005	0.01
% 325 mesh	0.3	0.01	0.01
Particle size, %			
−2 microns	30-40	77-80	90-94
+5 microns	40-50	3-6	——
GE brightness, %	80-82	84.5-85.5	86-87
Oil absorption (cc/100g clay)	24-26	32-34	36-40
pH	4.5-5.5	6.5-7.0	6.5-7.0
Iron oxide, %	0.4-0.8	0.3-0.4	0.3-0.4

Polyfil X and F are also available in spray-dried form as Polyfil XB and FB.

(Polyfils are made by J. M. Huber Corporation, 100 Park Avenue, New York 17, N.Y.)

Check 1669 opposite last page.

Silicone products are described in 16-page catalog liberally illustrated. Indexing system facilitates quick and easy location of silicone products commercially available. "The 1959 Reference Guide"—Dow Corning Corporation, Midland, Mich.

Check 1670 opposite last page.

Polyester coating resin is reviewed in three-page pamphlet including formula suggestions and enamel evaluations. "Alkydol S-1718" — Alkydol Laboratories, Inc., 3242 S. 50th Ave., Cicero 50, Ill.

Check 1671 opposite last page.

THAT'S INTERESTING

And away it goes

Urethane foam is playing an important part in the embryonic Space Age. Sensitive recording instruments carried in nose cone of Thor and Atlas missiles are being packaged in this synthetic material. No larger than an oversized basketball, sphere of foam withstands impacts up to 45,000 times that caused by the force of gravity.

Longer life

Mechanisms of aging are being investigated by chemists, physicists, biochemists, anatomists, psychologists, and other scientists. Goal is to assure that longer life also will mean fuller, more active life. How it's being done is told in *"The Laboratory,"* published by Fisher Scientific Co., Pittsburgh, Pa.

For more information on product at right, specify 1672 see information request blank opposite last page.

"The Fall of Icarus", by the 18th century illustrator Picart, is an imaginative conception, based on Greek mythology, of space propulsion by muscle power. This interpretation of it by wood engraving is one in a series of similar works undertaken especially for Hercules by Brussel-Smith, noted graphic artist.

IMAGINATION IN SPACE

Since Creation, man has looked out on space. At first, unknowing and incurious; then with the beginnings of understanding; now free and able to explore. Yet to move in space calls for wholly new concepts of energy.

This, then, is the working philosophy of Hercules in chemical propulsion: To design and manufacture highly concentrated packages of energy as propellants and rocket motors; each compatible, controllable, predictable; and each perfected for its specific mission.

HERCULES' BACKGROUND: A half-century of creative imagination in the evolution of propellants, from shotgun powder to space propulsion; encompassing research, design, engineering, and staff organization for the production of the most advanced propellants.

HERCULES POWDER COMPANY
INCORPORATED
900 Market Street, Wilmington 99, Delaware

XP59-1

Commercial surfactant used in acid or alkali media

Uses: Amphoteric surfactants have proved application in cosmetic and shampoo preparations, industrial and household cleaners, corrosion inhibitors, and emulsifiers.

Features: Adaptable to both acidic and alkaline media. Now commercially available.

Description: Deriphats are salts of N-alkyl beta-aminopropinates possessing both cationic and anionic functionality. All are reported to be excellent corrosion inhibitors and detergents, while some are effective foamers and wetting agents.

(Deriphats are a development of Chemical Division, General Mills, 9200 Wayzata Blvd., Minneapolis 26, Minn.)

Check 1674 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Al-pigment deleafing halted by stabilizer

Uses: Stabilizer for aluminum pigments in alkyd and high-acid varnish vehicles.

Features: Stabilizer prevents deleafing and premature greying of aluminum pigments in practically all alkyds and varnishes with acid number up to 28.

Description: Stabilizer is clear amber liquid. It has following properties:

Specific gravity	0.900
Pounds/gal	7.488
Gal/pound	0.1355

Use of stabilizer increases durability of paint. It also increases corrosion resistance against salt water.

(Alcoa stabilizer 5 is product of Aluminum Company of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.)

Check 1675 opposite last page.

Louisville Dryer—10 feet in diameter, 10 stories long!

Turn a ten story building on its side, and there'd be room to spare on either end of this huge pit lathe at Sharon, Pennsylvania where this 10′ x 110′ Louisville Dryer was fabricated.

This lathe is used for machining the reinforcing bands onto which are mounted the forged steel tires. This careful workmanship assures concentricity of the completed dryer shell—a primary factor in efficient seal operation.

Every Louisville Dryer is especially designed, manufactured, assembled and installed for its specific task.

If you have a problem involving process equipment, call or write our equipment specialist in your area. Here, as in so many fields, you'll find IT PAYS TO PLAN WITH GENERAL AMERICAN.

Process Equipment Division *Louisville Dryers*

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street, Chicago 90, Illinois
Offices in Principal Cities
In Canada: Canadian Locomotive Co., Ltd., Kingston, Ontario

Check 1673 opposite last page

THAT'S INTERESTING

Keeping abreast

Polytechnic Institute of Brooklyn is doing something about the Russian situation. It is offering two intensive, six-week long courses this summer for scientists and engineers who must keep up with current Russian publications. Says a spokesman: "The growing body of Russian scientific literature has created a great demand for persons with dual competence in some scientific area and in the Russian language."

Map clock

Telling time around the globe is made easy with clock designed with universal dial. World map is synchronized to movement of earth, indicating at a glance actual time of most key world cities. Clock is made by *Relied Clock Co.*, New York, New York.

For more information on product at right, specify 1676 see information request blank opposite last page.

Celanese PARAFORMALDEHYDE

...is formaldehyde with its sleeves rolled up and ready to work

Paraformaldehyde in present equipment

PRODUCES: 30% larger batches—greater resin output (higher reactivity)
⅓ shorter cycles—cuts hours off reflux and dehydration steps

Paraformaldehyde in new installations

ELIMINATES: heated storage tanks—large tankage areas

REDUCES: steam, electricity and cooking costs

DO YOU KNOW THAT Celanese is formaldehyde headquarters? It's your top supply source for formalin, paraformaldehyde, Formcels (in specified alcohols) and trioxane (completely anhydrous). Celanese Corporation of America, Chemical Division, Dept. 591-E, 180 Madison Avenue, New York 16, N.Y.

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver.
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16, N. Y. Celanese®

Celanese CHEMICALS

at El Dorado

Uniformity is FOREMOST

SEE one drum and you've seen them all. Each drum of El Dorado coconut oil fatty acid or methyl ester looks, feels, tests and works like every other for the *purity* and *uniformity* of your formulations.

That's why El Dorado esters, acids and oils have been famous for quality and dependability for over 65 years . . . because at El Dorado, Uniformity is Foremost.

EXAMPLE: All Eldo Lauric 96 shipped last year exceeded 97% purity—the purest, most uniform Lauric Acid available.

Supplies stocked near you. Write or phone today for samples and specifications. Department B-1

FATTY ACIDS

Caprylic Capric Lauric
Myristic Palmitic
Cocoleic Eldhyco Coconut

METHYL ESTERS

Caproate Caprylate Caprate
Laurate Myristate Palmitate
Oleate Eldo* 18 Coconate

*T. M. REG.

FOREMOST FOOD AND CHEMICAL COMPANY
EL DORADO DIVISION
P. O. Box 599, Oakland 4, California

Atlanta: Geo. E. Missbach & Co.
Boston: N. S. Wilson & Sons
Chicago: M. B. Sweet Company
Cincinnati: Howard Dock
Cleveland: F. W. Kamin Company
Detroit: Harry Holland & Son, Inc.
Houston: Joe Coulson Company
Kansas City: Vulcan Sales Company
Minneapolis: M. H. Baker Company
New Orleans: Breffeilh & Sheahan Company
New York: H. Reisman Company
Oakland: Foremost Food & Chemical Co.
Oklahoma City: Rullman Brothers
St. Louis: Harry A. Baumstark & Company

Check 1677 opposite last page

Coagulant-aid slurry cleans river water for wool-mill use

Slurry is called into play if pollution goes too high

Problem: Manufacture of cashmere fabrics and ladies' woolen goods, at Farnumsville, Massachusetts, plant of J. J. O'Donnell Woolens, Inc., was complicated by fact that only source of process water is river at point downstream from steel mill, sewage-disposal plant, and several other woolen mills.

At water-source point, river is polluted by high color from organic and inorganic dyes, various industrial wastes, and suspended matter. Also, saturation of water with detergents is so high that dam slightly upstream is normally coated with 6 to 12″ of foam.

Clarification was accomplished by chlorine, alum, and soda ash. Nevertheless, foreign dye particles and wetting agents from intake water, in addition to free alum carried over from settling basins, slipped through filters and into plant system.

Carryover was particularly excessive during cold or extremely dry periods. Even with heavily increased alum dosages, color removal in dye house was poor. This often necessitated reprocessing of delicate shades.

Boiler control became all the more difficult as detergents led to priming or foaming—and on dangerous carryover into stream system itself.

Solution: A coagulant aid (blend of processed bentonitic clay and organic poly electrolyte) was utilized on a standby basis, beginning in August 1956. Aid slurry is added to regular feed system whenever danger flags go up in boiler room or dye house.

Coagulant aid is dry-fed into 200-gal dish-bottom tank. Tank is equipped with electric mixer. Slurry is then fed into clarifiers through solenoid-operated valve. Valve is actuated by alum pump so that both feeds are simultaneous.

Order of feed as now employed is chlorine, alum, coagulant aid (when being uti-

lized), and soda ash. Best run is at pH of approximately 6.3, chlorine at 1 ppm, and alum at 2 grains. Initial dosage of coagulant aid was 10 ppm. This has since been reduced to approximately 5 ppm.

Results: When used, aid not only accelerated clarification process, but also eliminated all carryover. Floc obtained now is far heavier and larger and settles faster. Color removal is no longer a problem. Even with 25% reduction in alum feed, floc of 50% is obtained in 10 minutes and one of 80% in 20 minutes.

During summer-long drought of 1957, coagulant-aid slurry was constantly used. The company considers that it would have been very unlikely that plant could have continued operations throughout summer without use of coagulant aid.

(Coagulant aid is product of Hagan Chemical & Controls, Inc., Route 60 at Campbell's Run Rd., PO Box 1346, Pittsburgh 30, Pa.)

Check 1678 opposite last page.

Phosphate fertilizer material is 95% water-soluble, analyzes 18-46-0

Uses: Fertilizer material for use in mixing, granulation, and for direct soil application.

Features: Plant-food content is about 95% water-soluble. Analysis is 18-46-0. Manufacturer cites these advantages: lower material cost; increased production rate; extremely high analysis; better-conditioned final product.

Description: Product, made from wet-process phosphoric acid, has been used successfully in complete granulation units, batch granulators, and dry mixing, in commercial quantities. It's a modified diammonium phosphate, 95% of which is sized in the range of 6 to 16 mesh.

(Di-Mon is made by U. S. Phosphoric Products Division, Tennessee Corporation, Grant Bldg., Atlanta, Ga.)

Check 1679 opposite last page.

TOWER PACKING

All the facts about

HARSHAW *tellerettes*

Contained in this comprehensive booklet discussing the application of Harshaw Tellerettes to tower packing.

Subjects discussed at length (accompanied by pertinent charts)

1. The Tellerette Shape
2. Physical Characteristics
3. Lower Capital Investment and Operating Cost
4. Low Weight
5. Reduced Tower Height
6. Increased Tower Capacity
7. Support Plates
8. Corrosion Resistance
9. No Clogging

THE HARSHAW CHEMICAL CO.
1945 East 97th Street, Cleveland 6, Ohio
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Send today for your free copy . . . Use this convenient coupon!

THE HARSHAW CHEMICAL CO.
1945 EAST 97TH STREET
CLEVELAND 6, OHIO

Please send me _____ copies of your booklet, "Harshaw Tellerette"

Name_____

Company_____

Street Address_____

City_____ Zone_____ State_____

Check 1680 opposite last page

. . . higher meta content to give you more speed, lower unit cost in phenolic resin applications

PITT-CONSOL Meta Para Cresol offers 2.7 parts of meta to every one of para! That's more meta cresol **(over 70%)** than most mp cresols on the market . . . and the big reason why it provides a faster cure in brake linings, varnishes, molding compounds and many other phenolic resin applications. Investigate the advantages of PITT-CONSOL Meta Para Cresol . . . Available in 2° and 3° grades of high purity and closely controlled uniformity.

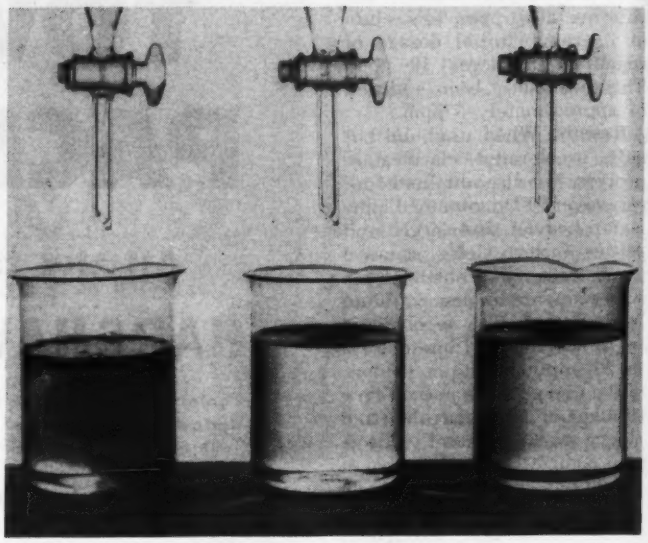
• For any cresylic acid with the quality and performance you seek look to Pitt-Consol first. Send for a brochure covering the complete line or consult our insert filed in Chemical Materials Catalog.

"Expanding cresylics to further industry"

PITT-CONSOL
Chemical Company
191 DOREMUS AVE. • NEWARK 5, N. J.

A SUBSIDIARY OF CONSOLIDATION COAL COMPANY

Check 1681 opposite last page



Solubility of Dowfax 2A1 is demonstrated here. Alkyl benzene sulfonate added to a 10% aqueous solution of hydrochloric acid (left) results in a heavy precipitate. A 10% solution of 2A1 (center) or a mixture of the two (right) added to electrolyte leaves a clear solution

Now commercially available for first time, Sulfonated alkyl diphenyl oxide is a general purpose . . .

Anionic surface-active agent displaying unusual solubility

Uses: As a surface-active agent in cleaning compounds, petroleum operations, paper making, or for other uses to promote chemical reactions where wetting out is important. It may be used as an additive to reduce viscosity of slurries and as a coupling agent for normally insoluble or slightly soluble organic materials in water.

Features: A result of four years of research and field application studies, anionic surface-active agent has unusual solubility and stability properties. Chemically a sulfonated alkyl diphenyl oxide, it is very soluble in water. At room temperature, 50% solutions can be prepared. At 77°F, it is soluble and stable at 0.1% concentration in nearly all 20% aqueous solutions of inorganic compounds. It is also soluble in organic acid and organic salt solutions.

Diphenyl oxide grouping results in molecular stability. This stability has been tested in a number of strong electrolytes covering entire pH range and at temperatures varying from freezing to boiling.

Description: Product is available in commercial quantities for first time. It is supplied as a light-colored, free-flowing powder and as a concentrated solution.

Inorganic compounds with which good solubility and sta-

bility may be achieved are: sodium hydroxide, hydrogen chloride, calcium chloride, sodium sulfate, sulfuric acid, phosphoric acid, sodium orthosilicate, tetrapotassium pyrophosphate, sodium chloride, zinc chloride, and nitric acid. Wetting, dispersing, emulsifying, and detergent properties are good in all these systems.

(Dowfax 2A1 is available from The Dow Chemical Company, Midland, Mich.)

Check 1682 opposite last page.

Paper dry-strength upped — no wet- strength increase

Uses: For stock addition or surface application to paper and paperboard. Particularly in manufacture of printing papers and similar grades.

Features: Resin improves dry strength of papers without increasing wet strength or creating broke problem.

Description: Synthetic water-soluble polymer resin's properties follow:

Appearance	Free-flowing powder
Color	Off white
Odor	Not perceptible
Active ingredients, % solids	93-96
Moisture, %	4-7
pH, 4% solution	approx 6.0

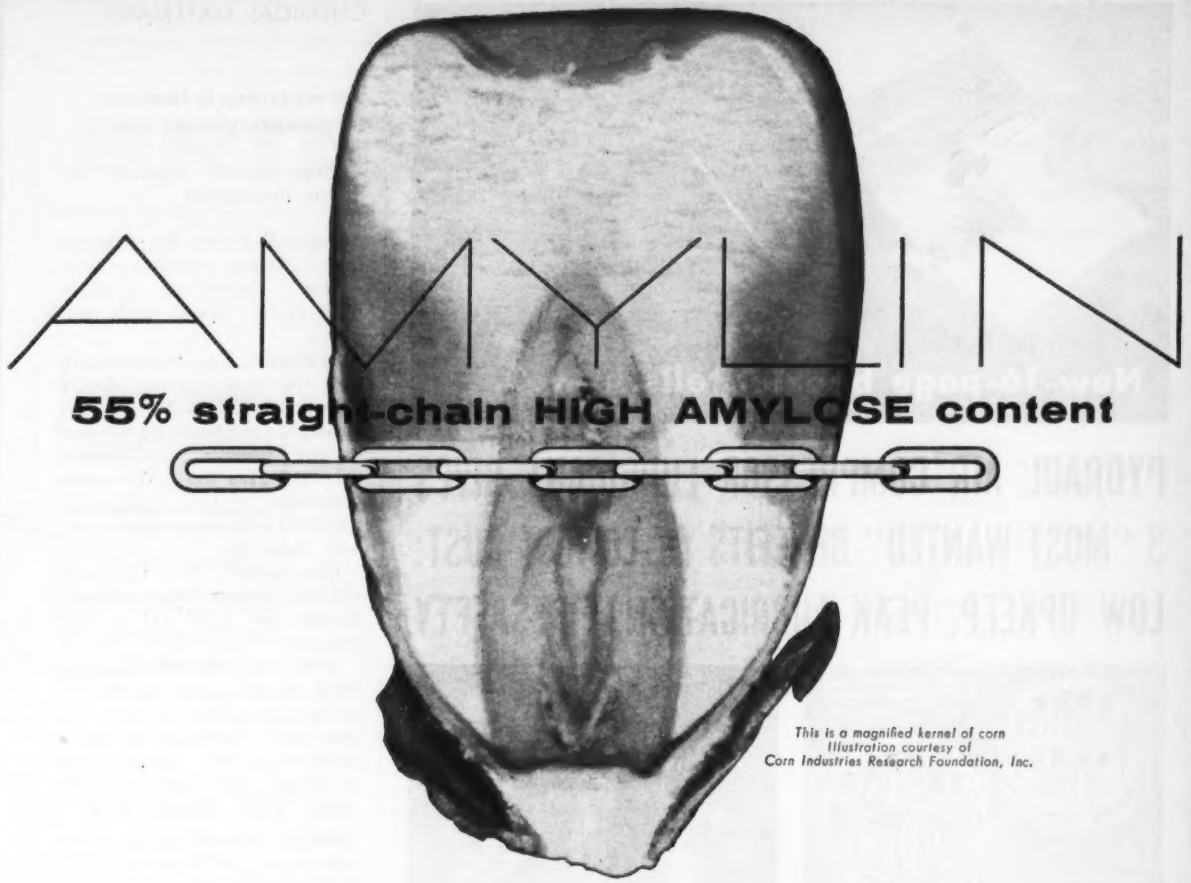
Brookfield viscosity at 75°F is aproximately 80 cps for 4% solution and approximately 1000 for 10% solution. Resin is infinitely soluble in water and insoluble in most organic solvents.

For stock addition, solution of resin can be added at convenient point such as beater chest, fan pump, or machine headbox. Alum fixes resin on fiber and can be added to pulp either before or after resin.

When used to improve surface properties of paper, resin can be applied alone as dilute solution. It is also possible to combine resin with starch at size press, tub size, or calendars.

(Accostrength® Resin 2386 is product of American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N.Y.)

Check 1683 opposite last page.



This is a magnified kernel of corn
Illustration courtesy of
Corn Industries Research Foundation, Inc.

A RADICAL GENETIC CHANGE

science and nature synthesize a new chemical polymer

NOW AVAILABLE in semi-commercial quantities. A radically altered natural starch polymer that contains 50-55% amylose —the straight-chain molecular component of starch.

This is the first major genetic advance leading to a potentially feasible starch containing 100% amylose. It's an exciting genetic achievement. Until now, the amylose content commonly available never exceeded 27%.

Geneticists have worked for many decades to develop special qualities in hybrid corn. Such as high yield, drought and insect resistance. A change in chemical structure was first accomplished industrially by the breeding of corn containing 100% amylopectin which NATIONAL introduced as AMIOCA in 1943. High amylose corn represents another major industrial accomplishment in the new area of plant breeding intended to alter the polymer structure of the starch itself which NATIONAL is introducing as AMYLIN®.

Milled from high amylose corn in the same way as ordinary starch, AMYLIN represents a marked step towards the unusual properties of amylose itself: Film formations, with greater strength than ordinary starch films. With improved water, grease and oil resistance. Flexibility. Unusually strong gels. Adhesiveness.

To the inquiring mind, these unusual properties suggest a variety of applications: Soluble and digestible packages for instant coffee, meats, vegetables, fish, fruit. Butter. Vegetable shortenings. Soluble packages for soap powders and insecticides. Grease and oil resistant coatings. Water and humidity resistant binders. Improved textile sizes and finishes, etc.

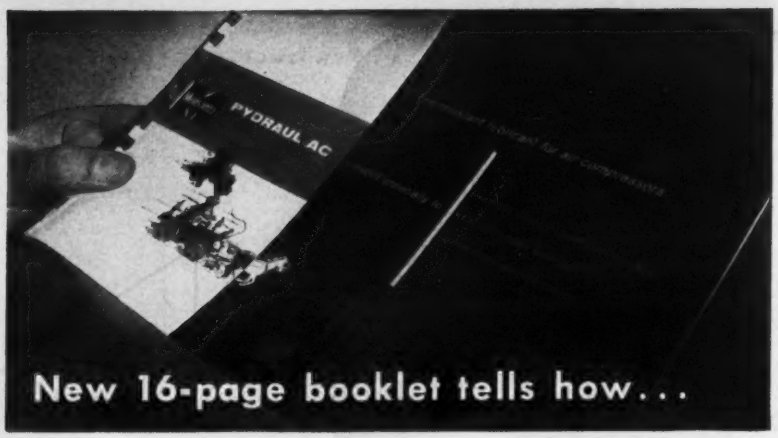
An invitation is extended to all who are interested in exploring the properties of this new high amylose starch.

Address: Amylin Starch Division, National Starch Products Inc., 750 Third Avenue, New York 17, N. Y.

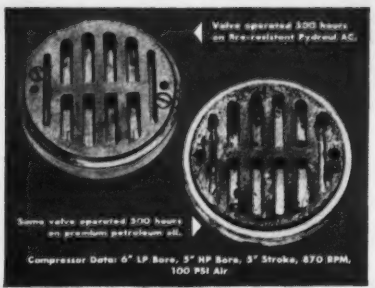
National

STARCH PRODUCTS INC.

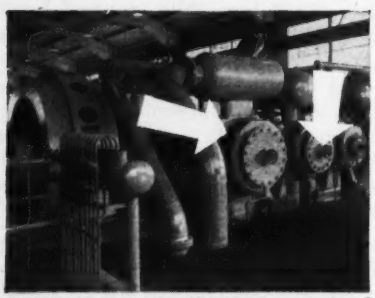
Check 1684 opposite last page



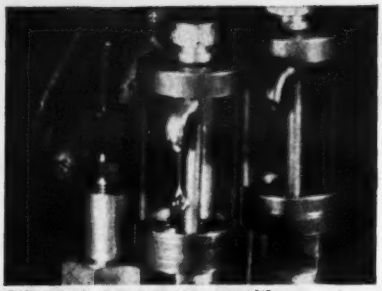
PYDRAUL AIR COMPRESSOR LUBRICANT GIVES 3 "MOST WANTED" BENEFITS AT LOWEST COST: LOW UPKEEP, PEAK LUBRICATION, FIRESAFETY


Valve operated 300 hours on fire-resistant Pydraul AC.
Same valve operated 300 hours on premium petroleum oil.
Compressor Data: 6" LP Bore, 5" HP Bore, 5" Stroke, 870 RPM, 100 PSI Air

PYDRAUL AC RUNS CLEAN—can substantially cut compressor upkeep costs because it reduces build-up of carbon and other deposits—extends time between overhauls. Side-by-side photos (above) of an exhaust valve—used in the same industrial air compressor with only the lubricant changed—show how Pydraul keeps systems freer from harmful and dangerous deposits than a premium oil. Lower maintenance costs alone usually justify use of Pydraul.



FIRESAFE PYDRAUL AC GIVES protection 2 ways in this danger zone—guards these three 4,000-hp. compressors. Petroleum oil residues deposit inside cylinders, valves, piping—glow hot and flake off—can unpredictably ignite flammable vapors from hot petroleum-based lubricants, causing fire... explosion! Monsanto's synthetic lubricant, Pydraul AC, essentially eliminates this basic cause of most compressor fires and explosions: It lessens carbon deposits and oxidation residues, and it is *fire-resistant.*



PYDRAUL AC LUBRICATES like premium-grade oil—good anti-wear and noncorrosive features give equipment long life. And Pydraul is the one lubricant for virtually every compressor you own—has demonstrated excellent lubricating efficiency in hundreds of compressors of all sizes produced by all major manufacturers—gives trouble-free compressor operation for many years. Now, Pydraul is effectively lubricating compressors operating at over 4500 psi.—many operating continually with exhaust air temperatures of 340°F.

PHOTO COURTESY GRACE CHEMICAL CO. DIV. OF W. R. GRACE & CO.

PYDRAUL—MONSANTO T. M. REG. U. S. PAT. OFF.

Now, illustrated booklet gives more details, including how to make the easy conversion to Pydraul AC. Write, today. No salesman will call unless you so request.

Monsanto

FOR CONVENIENCE, USE QUICK REPLY COUPON

Monsanto Chemical Company
Organic Chemicals Division
Dept. CP-1, St. Louis 66, Mo.

Please send me the new 16-page booklet on fire-resistant Pydraul AC lubricant for air compressors.

Name_____

Company_____

Address_____

City_____

Check 1685 opposite last page

CHEMICAL MATERIALS

Jet masstone is feature of phthalocyanine blue

Green-shade pigment resists flocculation

Uses: Pigment for printing inks, paints, plastics, and rubber. Useful as primary pigment or mixed with yellows.

Features: Has exceptionally jet masstone and bright greenish undertone. Highly resistant to flocculation and crystal growth in aromatic solvents. Has the well-known resistance of the phthalocyanines to bleeding, light, heat, and chemicals.

Description: Green-shade phthalocyanine blue pigment. Weight per solid gal is 13.94 pounds.

Using the Munsell Notation (full shade), hue is 8.8 PB, value 1.17, chroma 2.9. For one part pigment to three parts titanium dioxide, the readings are: hue, 2.9 PB; value, 3.46; chroma, 11.3.

(Solfast Blue G 43100 is development of Pigment, Color & Chemical Division of Sherwin-Williams Company, 260 Madison Ave., New York 16, New York.)

Check 1686 opposite last page.

Epoxy molding powder cures fast

Uses: Molding chemical-resistant filter plates, coil and resistor bobbins, shells for electrical components, relay assemblies, connector plugs, and switchgear.

Features: Molding powder has long storage stability, low shrinkage on cure, excellent electrical properties at elevated temperatures, good dimensional stability.

Description: One-component epoxy molding powder has heat distortion point exceeding 150°C, offers fast cure at moderate temperatures and good flow characteristics.

(Hysol 8610 is product of Molding Department, Houghton Laboratories, Inc., Olean, New York.)

Check 1687 opposite last page.

COPPER

COPPER SULFATE
CUPRIC CHLORIDE
MONOHYDRATED COPPER SULFATE
CUPRIC OXIDE
COPPER CARBONATE

SULFUR

SULFURIC ACID
SODIUM HYDROSULFITE
LIQUID SULFUR DIOXIDE
PARA TOLUENE SULFONIC ACID, ANHYDROUS
CHLOROSULFONIC ACID

TC TENNESSEE CORPORATION

INDUSTRIAL CHEMICALS

We mine Copper, Sulfur, Iron and Zinc and are basic producers of their chemical derivatives. Our technical know-how and basic position in these minerals is your assurance of exacting quality control and strict uniform consistency.

For Further Information or Samples, Make Request On Your Firm's Letterhead.

TENNESSEE CORPORATION
617-629 Grant Building, Atlanta, Georgia

IRON

FERRIC IRON SULFATE

ZINC

MONOHYDRATED ZINC SULFATE
ZINC OXIDE

MANGANESE

MANGANESE SULFATE
MANGANOUS OXIDE
MONOHYDRATED MANGANESE SULFATE

Check 1688 opposite last page

Brewers yeast fraction for vinegar making

A water-soluble fraction of autolyzed brewers yeast is available as a nutrient for vinegar manufacture. It contains more than 9.0% total nitrogen of which more than 35% is amino nitrogen. Form is a free-flowing powder rich in peptones and peptides. Price is 50c/lb in drum lots, 35c in ton lots, 27½c in carload lots.

(Amber BYF is a product of Amber Laboratories, Inc., 3456 N. Buffum St., Milwaukee 12, Wisconsin.)

Check 1689 opposite last page.

Polyethylene wax

. . . has been developed for use as modifier for paraffin and as additive for rubber and plastics. Physical properties of wax follow:

Ring and ball Softening point, °C	103-104
Penetration hardness, mm (100 g/5 sec/77°F)	0.3
Acid number	<1
Saponification number	<1
Color as liquid (Gardner)	2

(Epolene LV is product of Eastman Chemical Products, Inc., Subsidiary of Eastman Kodak Company, 260 Madison Ave., New York 17, N.Y.)

Check 1690 opposite last page.

No smell to powdered aluminum formate

Uses: Waterproofing of textiles and paper, and as a dye mordant.

Features: Odorless powdered form.

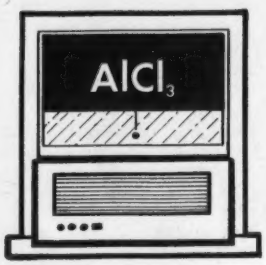
Description: Powdered aluminate formate also offers these advantages, as compared to solution forms: very high Al_2O_3 content; lower cost per active unit; savings on freight, storage, handling.

(Odorless aluminum formate powder is product of Aceto Chemical Co., Inc., 40-40 Lawrence St., Flushing 54, New York.)

Check 1691 opposite last page.

BRIEFS

on a way you might save money on caustic soda... why we air-condition aluminum chloride... three hypophosphites... a new bulletin on Hooker chemicals



Why we air-condition aluminum chloride

Ever notice how aluminum chloride lumps up in humid or rainy weather?

It's because this is a thirsty chemical, drinking water right out of the air. Trouble is that it loses a lot of its value as a catalyst and reactant when it's wet.

There was a time when we didn't even *try* to make aluminum chloride on humid days.

But now we've put air-conditioning in, and we can make it all year 'round —assuring you a uniform, full-strength product, come rain or come shine.

You can get it in any of these four sizes:

1. Extra fine—90% to 95% through 40 mesh.
2. Fine unscreened—almost all through 20 mesh.
3. Coarse unscreened—through 1 mesh, 25% to 35% through 20 mesh.
4. Coarse screened—through 1 mesh, on 20 mesh.

For technical data, just check coupon.

Did you know you can get *three* different hypophosphites?

You get your choice of *calcium, potassium,* and *sodium* when you order Oldbury® hypophosphites.

All three are N.F. Grade materials with the sodium salt also in a commercial grade, and are available in any quantity you need. They are all white crystalline compounds with no odor.

Calcium hypophosphite forms soluble salts and presents a good means of holding phosphorus in solution. It's typically 99% $Ca(H_2PO_2)_2$.

Potassium hypophosphite assays 99% KH_2PO_2.

Sodium hypophosphite is a strong reducing agent and antioxidant. The N.F. Grade assays 98% Min. $NaH_2PO_2.H_2O$. The Commercial Grade assays 84% Min. NaH_2PO_2. (Equivalent to 101% $NaH_2PO_2.H_2O$).

For more information on any or all of these compounds, send the coupon.

Maybe you can save money on liquid caustic soda

If, like most of us, you're tightening budget belts this year, this nomograph ought to be of interest to you.

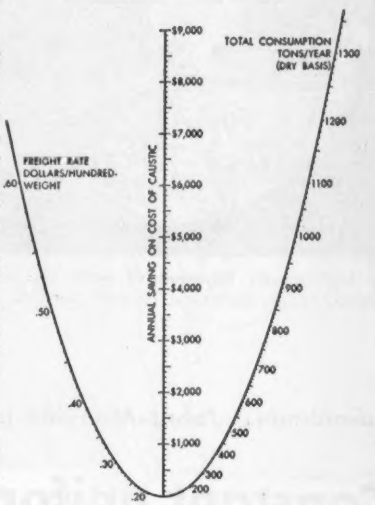
It can help you find out quickly if any substantial savings will follow a switch from 50% liquid caustic soda to 73%.

Draw a line from your current freight rate to your estimated annual consumption.

Any savings will show at the point where you cross the center line.

Of course, you'll have to figure in an annual depreciation on dilution equipment. We'll be glad to advise you on what you need, and how you might save money here, too.

For more facts like these on how to pare your caustic soda costs, check the coupon for our *Caustic Soda Buyer's Guide.* Better yet, call the nearest Hooker Sales office.



New bulletin lists chemicals, useful data

To bring our fast-growing list of chemicals up-to-date, we've prepared a new General Products List.

Its 12 pages give you a quick reference guide to all our chemicals and services.

With each product is a condensed listing of important specifications along with information on shipping containers.

For a copy, just check the coupon for Bulletin 100-B.

For more information, check here and mail with your name, title, company and address.

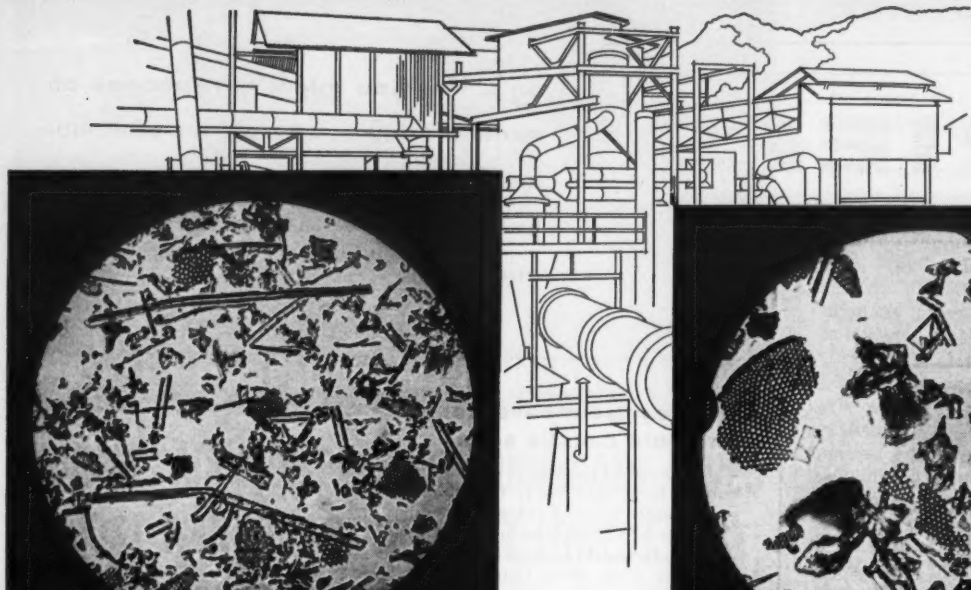
- ☐ Caustic Soda Buyer's Guide
- ☐ Aluminum Chloride
- ☐ Calcium Hypophosphite, N.F.
- ☐ General Products List, Bulletin 100-B
- ☐ Potassium Hypophosphite, N.F.
- ☐ Sodium Hypophosphite, N.F.
- ☐ Sodium Hypophosphite, Comm.

HOOKER CHEMICAL CORPORATION
505 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

Sales Offices: Chicago Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

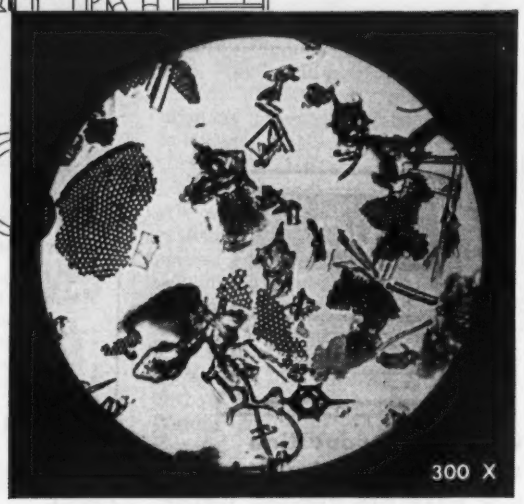
HOOKER CHEMICALS PLASTICS

Check 1692 opposite last page



Milling and calcining equipment used for all Celite grades.

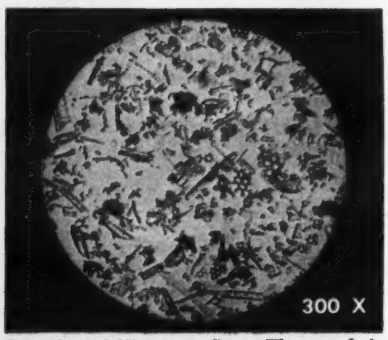
For high-clarity filtration of most liquids—use this specially milled diatomite, Hyflo Super Cel.



For filtration of larger suspended particles—Celite 545 combines maximum clarity plus faster flow rates.

In diatomites, Johns-Manville precision processing works for you

Constant uniformity in every grade of Celite assures consistent results, less down-time



For mineral filler use—Super Floss grade is made up of carefully sized fines air-floated off in the bag house.

Typical J-M bag house equipment.

As the microscope shows, each grade of Celite* diatomite has its own distinctive particle size distribution. Yet no matter where or when purchased, each remains uniform from bag to bag—your assurance of top production results with minimum down-time.

Three examples of flux-calcined Celites are shown here. Hyflo® Super Cel is widely used for filtration in many industries. It has just the right combination of coarse and fine particles to assure optimum clarity and flow rates. Celite 545, with a higher percentage of coarse particles, is used to achieve maximum clarity and faster flow rates with liquids that have larger suspended particles.

Super Floss, one of several bag house grades, has fine particle size distribution. A white powder, it is processed within very narrow tolerances (less than 1% retained on 325 mesh). It is a popular filler in fine products such as silver polishes.

Johns-Manville can precision-produce so many different grades of Celite because it mines the material from the world's largest and purest commercially available deposit. For assistance with specific filtration or mineral filler problems, talk to a nearby Celite engineer. Or write direct to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

JOHNS-MANVILLE

Check 1693 opposite last page

CHEMICAL MATERIALS

Reinforced parts made with polyester resin withstand 400°F

Uses: Fabrication of glass-fiber-reinforced parts for service up to 400°F. Example: heating ducts, particularly in aircraft.

Features: Typical glass-cloth or glass-mat laminates exhibit adequate initial strength and no fall-off in strength after 96 hr at 350-400°F. Flexural strength and modulus often increase during this exposure.

Description: Polyester resin is supplied with 50-poise viscosity, may be thinned with small amount of styrene for hand lay-up without significant sacrifice in hot strength.

(Laminac 4104 resin is development of Plastics and Resins Division, American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y.)

Check 1694 opposite last page.

Acrylic-type thermoplastic has 250°F heat distortion

Uses: Applications in injection molding and extrusion.

Features: Plastic has heat-distortion temperature of approximately 250°F.

Description: Transparent acrylic-type thermoplastic polymer has potential application in automotive, aircraft, electrical appliance, and glassware industries, among others. It may be immersed in boiling water without affecting its water-white transparency.

(PL-11 molding powder is product of J. T. Baker Chemical Co., Phillipsburg, N.J.)

Check 1695 opposite last page.

Diethyl succinate's physical, physiological, and chemical properties are covered in four-page bulletin. Specification limits and shipping data are summarized, as well as data on constant boiling mixtures formed with water. Graph of vapor pressures at various temperatures is given. Bul F-40386—Union Carbide Chemicals Company, Div. of Union Carbide Corporation, 30 East 42nd St., New York 17, N. Y.

Check 1696 opposite last page.

THAT'S INTERESTING

Stamped to death

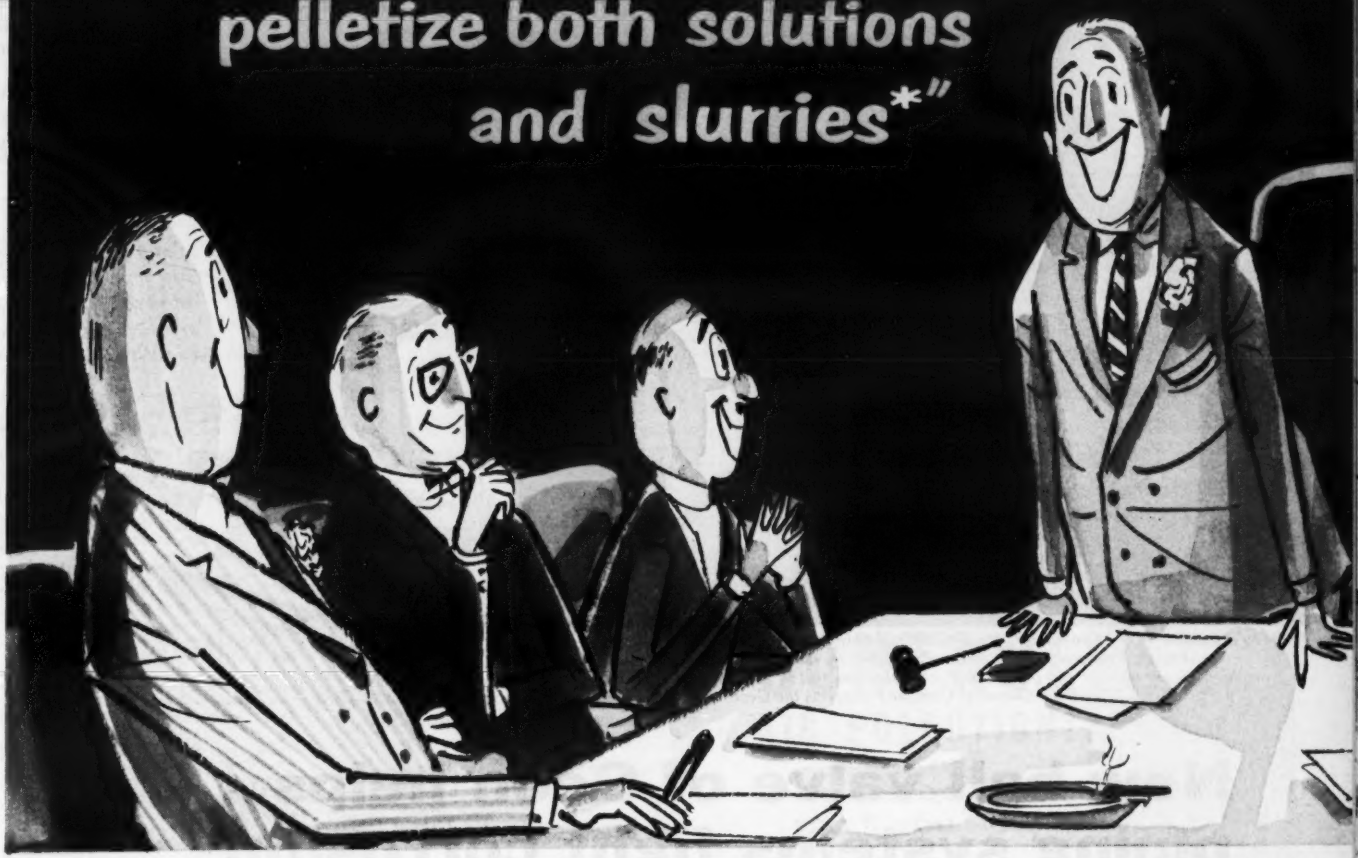
There seems to be no end to use of trading stamps. Funeral parlors are now said to be offering them to customers—or, rather, to their heirs. Another new user is reported to be movie houses, where stamps are being used to boost attendance.

Yummy!

It's possible crackers might be sold with cigarets in the future just because a group of scientists in Wisconsin set out to develop new uses and markets for the state's cheese products. A note in the *Gentry Serenader* reports that by using a filter containing powdered cheese, 85% of tars in cigaret smoke can be removed. That's 30% more tar than is reportedly removed by filters now on market.

For more information on product at right, specify 1697 see information request blank opposite last page.

"Gentlemen...the new C+I spherodizer process can pelletize both solutions and slurries*"



* **Ammonium Nitrate Phosphate** *(26-26-0)*

Ammonium Phosphate *(21-53-0)*

Ammonium Nitrate *(from 83% solution)*

Urea *(from 70% solution)*

Complex Fertilizer *(all ratios and grades)*

Ammonium Sulphate

Ammonium Nitrate Limestone

C&I's new SPHERODIZER PROCESS† can pelletize solutions and slurries for the production of high analysis fertilizer without utilizing prilling or other costly granulating methods. Outstanding advantages of the Spherodizer Process are: comparatively low capital investment in plant; a recycle rate less than 20%; exceptional flexibility in that the process can spherodize any slurry and low concentrated solutions. The Spherodizer Process produces a uniform, homogenous, and symmetrical pellet in any desired size range that can be stored in bulk or bags. Plants are available in any desired capacity.

Let our free, illustrated brochure give you all the details, graphically. Product samples on request.

†*Pat. applied for*

C&I complex fertilizer

C&I

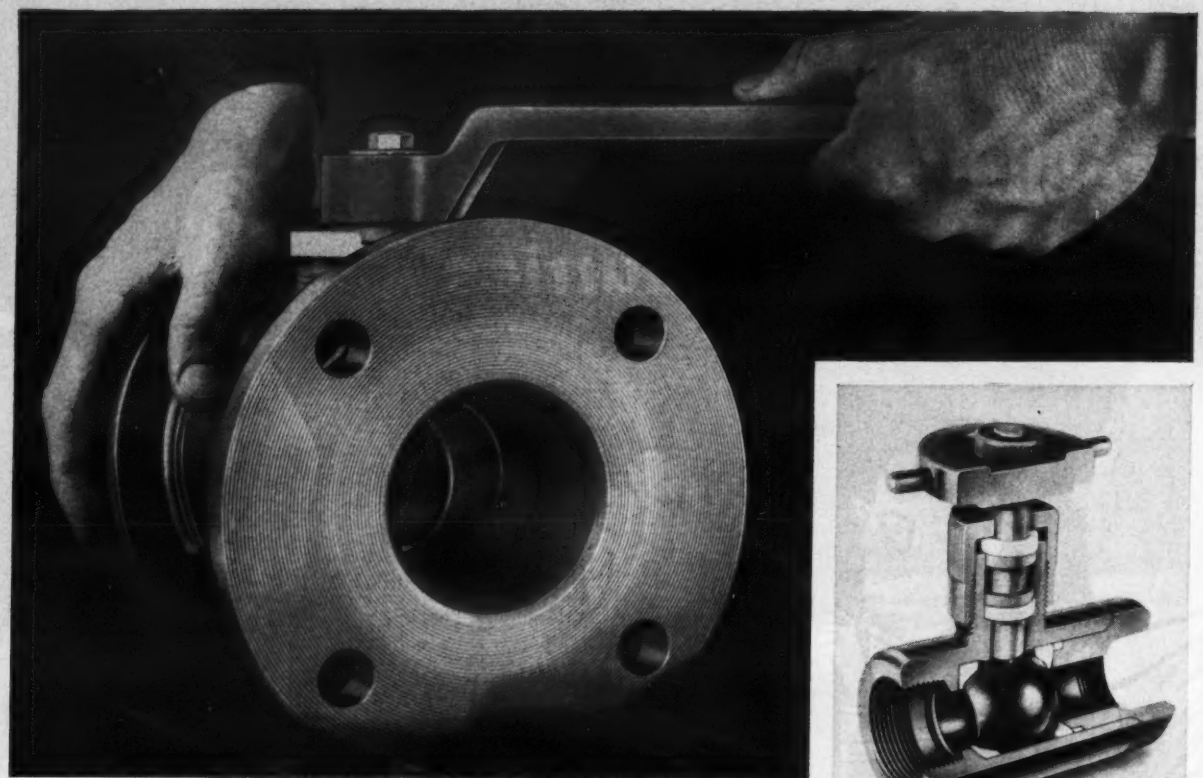
THE CHEMICAL AND INDUSTRIAL CORP.

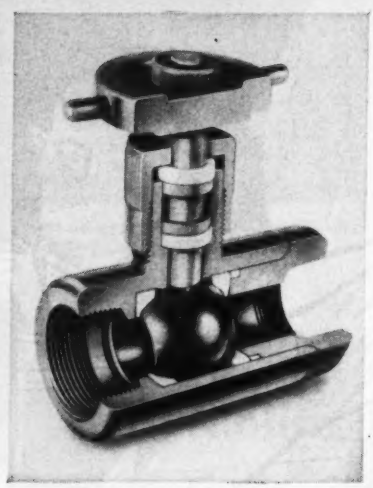
CINCINNATI 26, OHIO

Designers and Constructors of Plants for the Processing of Ammonia • Available throughout the World

News about

B.F.Goodrich Chemical *raw materials*





Valves by Jamesbury Corp., Worcester, Mass. Geon rigid vinyl parts molded by Mannesman-Easton Plastic Products, Inc., Easton, Pa. Valves in sizes from 1/2" to 4", shown in large photograph, are rated at 150 psi to 100 F. and at 50 psi to 130 F. They can be remote operated. B.F.Goodrich Chemical Company supplies the Geon rigid vinyl material only.

New ball valve of Geon helps piping systems fight corrosion

Thousands of test cycles with this new valve made from Geon rigid vinyl have proved the effectiveness of its seal, either at full pressure or vacuum. Since it is made entirely of Geon except for seats and seals, it offers pipe users another weapon for the battle against corrosion. Geon offers superior resistance to oils, acids, alkalies and most chemicals.

In addition, rigid Geon weighs less than metal. Shipping weights are lower, installation is easier. These valves can be obtained with threaded ends, weld ends, or flanges. They are self-compensating for changes in pressure or temperature. There is no problem of galling or seizure. No lubrication is needed.

Geon offers remarkably varied opportunities for products that open new markets or improve present applications. In rigid form it is being used for pipe, window frames and ductwork . . . in other forms for weatherstrip, wall coverings, foam products, or coatings for metal, paper or textiles. One member of the Geon family can surely help you make a better product. Write for information to Dept. AL-3, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich

GEON polyvinyl materials • HYCAR rubber and latex
GOOD-RITE chemicals and plasticizers • HARMON colors

Check 1698 opposite last page

Light color feature of amides

Amides of very light color are being produced commercially by Archer-Daniels-Midland at its Wyandotte, Michigan, plant. This relative lack of color is important particularly when using in textile finishes.

The Wyandotte plant is manufacturing coco, hydrogenated tallow, stearyl, erucyl, and oleyl amides from the fatty acids made there.

Besides textile application, amides can be used as foam stabilizers, plastic-film antiblock and lubricating additives, in durable water repellants. They improve penetration, flexibility, and translucency of wet-waxed paper coatings; improve adhesion of inks; and assist wax phase of waterproofing and protective-coating emulsions to exhaust into textiles, masonry, metals, and paper.

They also can be used as mutual solvents for waxes and resins, viscosity modifiers, and melting-point improvers.

(Adogen amides are available from Archer-Daniels-Midland Company, 700 Investors Bldg., Minneapolis 2, Minn.)

Check 1699 opposite last page.

Foaming in place eliminates waste

Uses: Preparation of water-, Freon-, or Genetron-blown rigid polyurethane foams.

Features: Use of polyester permits foaming in place. This eliminates trimming waste.

Description: Foam is formed by mixing polyester with a particular polyisocyanate and a blowing agent. No pre-polymer formation is necessary.

Adhesion of foams to wood, metal, and reinforced plastics is good. Foams produced by polyester also have good insulating properties.

(Pleogen 4002 is product of Mol Rez Division, American Petrochemical Corporation, 3134 California St. N.E., Minneapolis 18, Minn.)

Check 1700 opposite last page.

Dawe's

a dependable source for

SODIUM GLUCONATE

and

GLUCONIC ACID

Promptly available in any quantity.

Warehouse stocks across the country.

Dawe's high quality is assured.

Write for technical data and samples.

Dawe's

DAWE'S LABORATORIES, INC.
4800 South Richmond Street
Chicago 32, Illinois

Check 1701 opposite last page

You don't have to be a Monkey—

. . . to loosen frozen bolts on utility poles. The new Aerosol Kroil, which can be squirted with one finger, loosens the most stubborn frozen metal parts . . . FAST. More than 18,000 shops depend on Kroil whenever frozen metal parts threaten to tie up production or waste manhours. In this new package it is the finest rust-busting tool ever . . . shoots a stream 3 ft. yet won't leak. One customer said, "before trying Kroil we broke off every nut (on our heat treat trolleys), since then we have not lost one and have decreased the repairing time from 30 minutes to about 6 minutes per trolley."

KANO KROIL LOOSENS FROZEN METAL PARTS

Use Kroil on all dismantling jobs; for filing, sawing, honing; . . . also keeps air driven tools running freely.

Just try Kroil on a make good basis. Case of 12 Aerosol Kroil 12 ounce cans $18.75 f.o.b. factory or send $2.00 for one can postpaid. If it doesn't perform to suit you, return the empty can for refund.

KANO LABORATORIES 1051 Thompson Lane Nashville 11, Tennessee

Check 1702 opposite last page

Color and gloss retention for industrial finishes

Uses: In protective coatings, particularly those for appliances.

Features: Provides industrial paint finishes with greater retention of initial color and gloss and increased resistance to solvents and staining.

Description: Acrylic copolymer resin's properties are as follows:

Viscosity (Gardner-Holdt)	Y-Z_1
Solids	54-56
Lb/gal	8.25-8.35
Color (Gardner)	2, max
Solvent, %	78 (xylol) 22 (butanol)
Reduction viscosity (Gardner-Holdt)	S-U at 45% in xylol

Resin provides good gloss at pigmentation levels as high as 1:1, pigment to vehicle solids by weight. This factor, combined with high resistance properties, precludes use of more than 1-½-mils dry-film thickness.

(Poly-Tex 900 is product of Resins and Chemicals Division, Jones-Dabney Company, Division of DeVoe & Raynolds Company, Inc., Subsidiary of Merritt-Chapman & Scott Corporation, PO Box 1863, Louisville 1, Ky.)

Check 1703 opposite last page.

"Try looking on it as two parts hydrogen and one part oxygen."

Geared for Paint Manufacturers

LOW ANGULAR SHEEN

Tamms

NEW 680 MULTICEL

GRIT FREE

FLATTING

WHITENESS

LOW COST

This new and exceptionally fine grade Multicel (Diatomaceous Earth) will materially reduce your RMC per gallon while maintaining your specific quality. It is ideally suited for low luster house paints.

TAMMS INDUSTRIES CO.
RM-41 228 N. LA SALLE ST., CHICAGO 1, ILL.
Suppliers to the industry

Check 1704 opposite last page

CONTROL AIR POLLUTION!

FREE BROCHURE TELLS YOU HOW

Now learn how you can clean up combustible pollutants, fumes and odors from your processes. An Oxy-Catalyst System can be engineered to your special requirements. Catalytic oxidation is the most effective air pollution control and waste heat recovery method ever developed! Installation often leads to actual fuel savings. Investigate! Send today for brochure, "Oxycat Systems"—packed with facts and figures on typical industrial installations. Mail coupon below.

OXY-CATALYST, INC. Wayne 7, Pa., U.S.A.
Catalysts for fume and odor elimination, air pollution control and waste heat recovery

Send me free brochure, "Oxycat Systems"

Name_____

Firm_____

Street_____

City_____ Zone_____ State_____

Check 1705 opposite last page

Now...at no increase in price
40% more HP...longer service life
with Gates Vulco Ropes

Gates brings you, through *Specialized* Research in V-Belts, another important cost-saving advance:

Now—at no increase in price—the horsepower rating of Gates Vulco Ropes has been increased 40%.

As replacements on standard drives, these V-Belts with 40% more load carrying ability will give longer service. Longer life reduces down-time, and cuts belt replacement costs.

And as the tag tells you: Belts labeled "Gates Vulco Rope" or "Gates Hi-Power" are identical in construction and can be used interchangeably in matched sets.

Available Now
from your nearby Gates Distributor

Today, all Vulco Ropes in Gates distributor and warehouse stocks have the new higher horsepower rating.

See the Yellow Pages of your phone book for your nearest Gates V-Belt distributor.

Designing NEW Drives?

For new drives, Gates now offers you the *new Super HC V-Belts and Sheaves*—the most advanced concept in power transmission in 25 years. The Super HC Drive is far more compact... takes up to 50% less space. Costs less, too. You save as much as 20% over present V-Belt drives. Ask your nearby Gates distributor for Handbook DH-900 entitled, "The Modern Way to Design V-Belt Drives."

The Gates Rubber Company Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario

Gates

World's Largest Maker of V-Belts

TPA-412

Gates VULCO ROPE Hi-Power V-Belts

Check 1706 opposite last page

CHEMICAL MATERIALS

Plant goes on stream in polycarbonate-resin production

Plant-prototype information to be provided

Semi-works plant for production of polycarbonate resin has been recently completed. Plant is designed to produce increased quantities of resin for market-development work. It should also provide prototype information for commercial-plant design.

Transparent, light-amber compound may be injection molded or extruded in conventional equipment. Products

Plastic parts formed from molding compound have application in variety of industries, including electronics, aircraft, and automotive

can be machined, polished, or solvent-cemented. Molded material has been evaluated in more than 100 applications for electronic, aircraft, and automotive industries.

Properties of polycarbonate-resin molding compound are as follows:

Elongation, %	60-100
Compressive strength, psi	11,000
Flexural strength, psi	11,000-13,000
Dielectric constant (60. cy)	3.17
Heat distortion Temperature (264 psi), °F	280-290
Water absorption (24-hr immersion), %	0.2
Thermal conductivity, cal/sec/cm²/°C/cm	4.6×10^{-4}

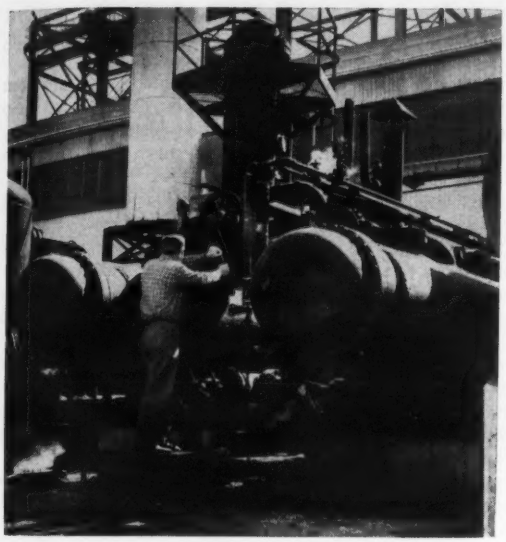
(Lexan® is product of Chemical & Metallurgical Division, General Electric Company, Pittsfield, Mass.)

Check 1707 opposite last page.

Odorants field is discussed in 38-page "The Fragrant Life" — Dodge & Olcott, Inc., 180 Varick St., New York 14, N. Y.

Check 1708 opposite last page.

U.S. and World
PETROCHEMICALS SECTION OF CHEMICAL PROCESSING



This twin dryer removes moisture from air before it goes to air separation equipment

Dryers Charged With Activated Alumina Keep Ammonia Plant on Stream

Remove water from 24 million cu ft of air and 20 million cu ft of hydrogen per day so that ice does not accumulate in equipment and shut down plant

GORDON WEYERMULLER, Petrochemical Editor
with **P. T. MARTIN,** Engineering Dept.
Spencer Chemical Company

PROBLEM: Ammonia plant of Spencer Chemical Company at Vicksburg, Mississippi, needed dry air and dry hydrogen for synthesis process. Ammonia is produced by partial oxidation of natural gas.

Dry air was required for air separation plant operating at temperatures several hundred degrees below zero F. If the air were not dry, moisture would rapidly accumulate as water ice in the air separation equipment and plug it completely. Plant could not operate with saturated air. Air plant is designed to produce more than 100 tons of oxygen per day and a proportionate amount of nitrogen.

Final purification of hydrogen used for ammonia synthesis is accomplished with liquid nitrogen. Again, moisture in the hydrogen would deposit in the nitrogen wash equipment as water ice and rapidly plug it. As in the case with air, more moisture in the hydrogen than the design quantity would cut operating efficiency.

Solution: Plant installed two sets of dryers charged with activated alumina — one unit for drying air and one for drying hydrogen.

Each dryer has two columns containing activated alumina. As wet air or gas is passed over the alumina in one column, the moisture is adsorbed.

After one column has picked up a considerable quantity of water, valves are reversed to pass material being dried through second column. Meanwhile, alumina in first column is regenerated. This cycle is repeated over a period of time, which depends on amount of water being removed.

At the Vicksburg plant, air dryers are manually switched and regenerated with hot, dry nitrogen. Hydrogen dryers are automatically switched and regenerated by heated hydrogen side stream.

At Spencer Chemical, CO_2 and water ice which have deposited in cold equipment over

Ammonia plant of Spencer Chemical at Vicksburg

a period of time are removed by defrosting. Period between defrostings depends on the moisture in inlet gases, the volume of these gases handled, and the efficiency of the gas-drying units.

Air separation plant and nitrogen wash equipment are arranged with dual exchanger banks so that one can be defrosted while the other is in service. These exchangers are

Hydrogen to be used for ammonia synthesis is dried in this dual unit, which is charged with activated alumina

normally defrosted every few days. Entire air separation and nitrogen wash units are completely defrosted about once per year.

Results: Dual dryers used at Spencer have been in service for more than four years, helping to keep the ammonia plant on stream. One unit dries 24 million cubic feet of air per day at 600 psi and 40°F to a dewpoint of −60°F. The other unit dries 20 million cubic feet of hydrogen per day at 300 psi and 40°F to −80°F dewpoint.

Efficient operation of the dryers helps to stretch periods between defrostings. Activated alumina used in dryers has lasted for extended periods without requiring additional quantities. It is non-corrosive and non-contaminating.

(Lectrodryers are product of Pittsburgh Lectrodryer, Division of McGraw-Edison Co., 307 Thirty-second St., Pittsburgh 30, Pa.)

Check 1709 opposite last page.

(Activated alumina is product of Chemicals Department, Aluminum Company of America, Alcoa Building, Pittsburgh 19, Pennsylvania.)

Check 1710 opposite last page.

See why ALCOA ALUMINUM makes a good design habit

Requirement: Increase original service life of process equipment

Key to Good Design: Use Alcoa Aluminum to combat corrosion

Fighting corrosion is one of many ways aluminum can increase the original service life of your equipment. In major segments of the process industries, ALCOA® Aluminum is becoming the accepted standard for doing just this.

Chemical and petroleum plants find many uses for aluminum in their processes. Aluminum towers, driers and building products ward off atmospheric corrosion in seacoast locations, salt mines, and in similarly aggressive environments . . . areas where other metals fail. The electric power industry uses aluminum to resist the corrosive effects of soot, flyash, gases and vapors from the combustion of coal.

The food processing industry takes advantage of aluminum's other important features. Because it looks clean, is easily kept clean, and imparts no color or flavor to the product, aluminum is the best choice for pans, churns and vessels. These aluminum containers also have high heat conductivity . . . an important consideration where heat must be applied to the product.

The brewing and pharmaceutical industries use aluminum for still another reason. Here, process equipment must be nontoxic to micro-organisms. That's why aluminum pasteurizers and other equipment are specified for fermentation reactions in microbiological processes.

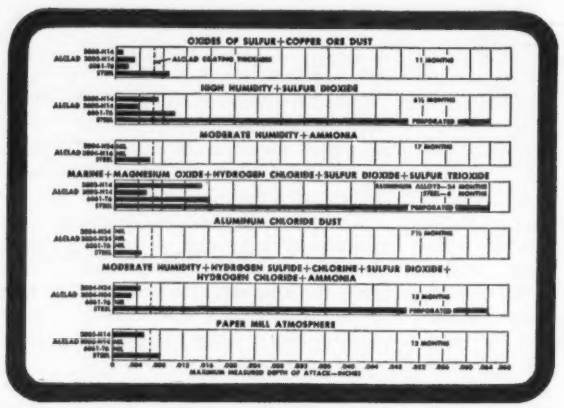
For other processes, aluminum's freedom from embrittlement at extremely low temperatures makes it particularly attractive. Good examples are the production of hydrogen, helium, oxygen, and various other cryogenic substances.

There's an area in your process where ALCOA Aluminum can help cut costs or improve efficiency. ALCOA can help you specify the alloy you need from the wide range available. Each offers specific advantages, and there is one certain to fit your requirements.

ALCOA engineers have worked closely with all segments of the process industries for over 40 years, and their unparalleled experience in this field is available to you for the asking. Write to the address on the coupon, stating your requirements as specifically as possible. ALCOA's development engineers will welcome the opportunity to work with you on your problems.

You also can take advantage of the wide selection of free ALCOA literature on aluminum for process equipment. Simply check the booklets you want on the coupon and mail to the address indicated. ALCOA will forward your material promptly and without obligation.

ALCOA is conducting a series of engineering conferences on process industries applications of aluminum during 1959 in a number of major cities. Contact your nearest ALCOA sales office for full particulars and dates.


OXIDES OF SULFUR + COPPER ORE DUST
HIGH HUMIDITY + SULFUR DIOXIDE
MODERATE HUMIDITY + AMMONIA
MARINE + MAGNESIUM OXIDE + HYDROGEN CHLORIDE + SULFUR DIOXIDE + SULFUR TRIOXIDE
ALUMINUM CHLORIDE DUST
MODERATE HUMIDITY + HYDROGEN SULFIDE + CHLORINE + SULFUR DIOXIDE + HYDROGEN CHLORIDE + AMMONIA
PAPER MILL ATMOSPHERE

Resistance of Alcoa Aluminum alloys to certain atmospheric contaminants, compared with steel.

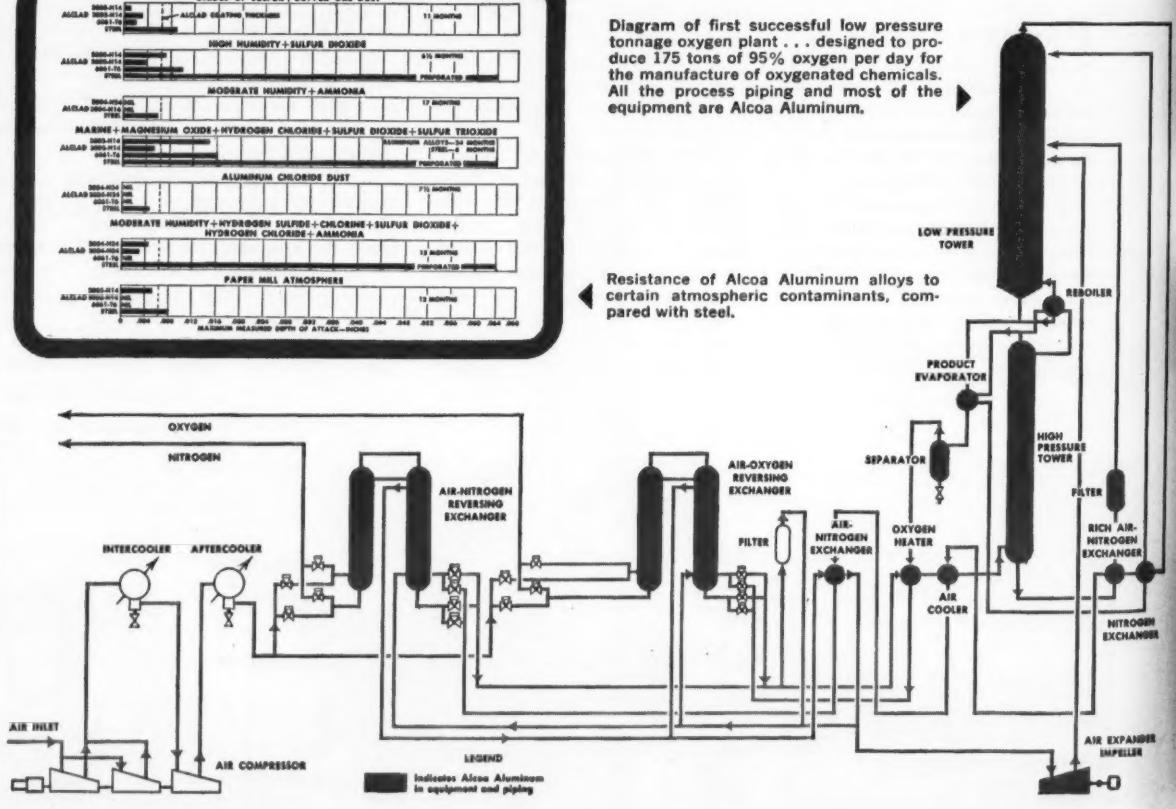
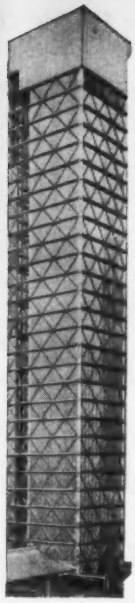
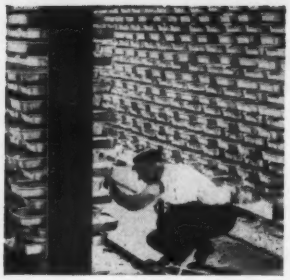


Diagram of first successful low pressure tonnage oxygen plant . . . designed to produce 175 tons of 95% oxygen per day for the manufacture of oxygenated chemicals. All the process piping and most of the equipment are Alcoa Aluminum.



An aluminum prilling tower, 260 ft high by 40 ft square, used in the manufacture of solid ammonium nitrate. Auxiliary buildings are also covered with aluminum because of the corrosive atmospheres present.

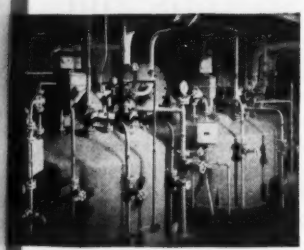


Aluminum solidification pans and molds for solids such as stearic acid and waxes resist corrosion and do not discolor the product.

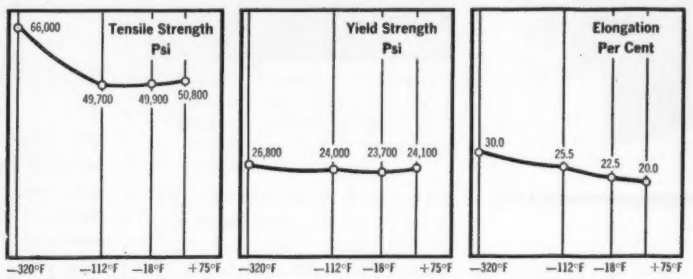
The naval stores industry uses aluminum to protect color and quality of rosin, rosin derivatives, turpentine and similar pine products.

Butter has little tendency to adhere to the cast aluminum surface of this churn.

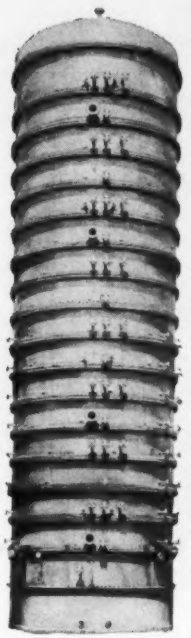
The sanitary appearance of aluminum covers and siding over these brewery pasteurizers is easily maintained.



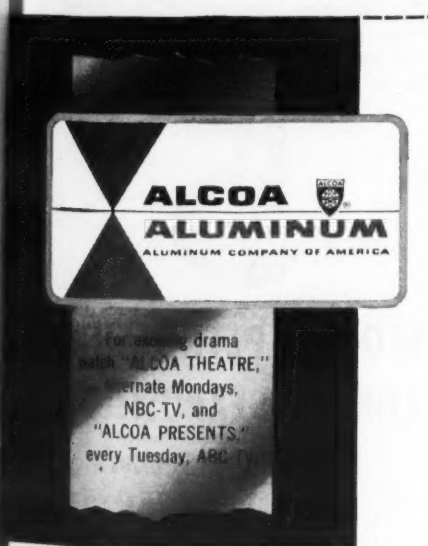
These 3,000-gal aluminum adsorption tanks are used in the production of antibiotics. Aluminum distribution systems for acetone and deionized water also are shown.



Alcoa Alloy 5456-O is used extensively in process equipment, especially for cryogenic applications. The graphs above show how this alloy's physical properties actually improve at low temperatures. At minus 320 degrees F it improves 30% in tensile strength, over 10% in yield strength and 50% in elongation.



Large scrubber tower for solvent recovery in a synthetic textile plant.



Aluminum Company of America
872-E Alcoa Building, Pittsburgh 19, Pa.

Please send me the following literature on Alcoa Aluminum applications in the process industries:

- ☐ GL866—Unfired Pressure Vessels of Aluminum Alloys
- ☐ GL149—Welded Aluminum Gas Cylinders, ICC approved
- ☐ 10197—Aluminum Pipe and Fittings
- ☐ 10186—Alcoa Aluminum Heat Exchanger Tubes
- ☐ 10270—Alcoa Utilitube
- ☐ 10460—Process Industries Applications of Alcoa Aluminum
- ☐ DD508—Aluminum Alloys in Tank Trucks and Tank Trailers
- ☐ 10387—Alcoa Standard Storage Tanks
- ☐ 20849—Resistance of Aluminum Alloys to Weathering and Resistance of Aluminum Alloys to Chemically Contaminated Atmospheres
- ☐ 20265—Have You Tried Aluminum in Your Refinery?
- ☐ GL93—Aluminum in the Pulp and Paper Industry
- ☐ 20272—Aluminum Alloys for Handling High Purity Water

Name_____

Company_____ Title_____

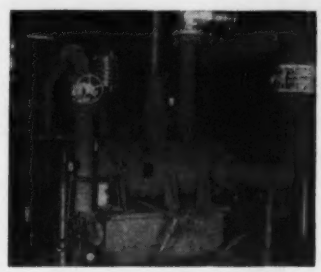
Address_____

City_____ State_____

Check 1711 opposite last page

Oxygen compressor features safety, high speed

This centrifugal compressor is designed to handle 2000 inlet cfm of oxygen from atmospheric pressure to a discharge pressure of 120 psia. The compressor is direct connected to



Oxygen compressor features high speed, stainless steel construction, and water-lubricated bearings

a 750-hp steam turbine running at 30,000 rpm. Compressor casing is completely constructed of stainless steel. Journal bearings are water lubricated, hence minimizing the danger of fire which has always been a problem when compressing oxygen.

(Oxygen compressor is product of Elliott Company, Div. of Carrier Corporation, Jeannette, Pa.)

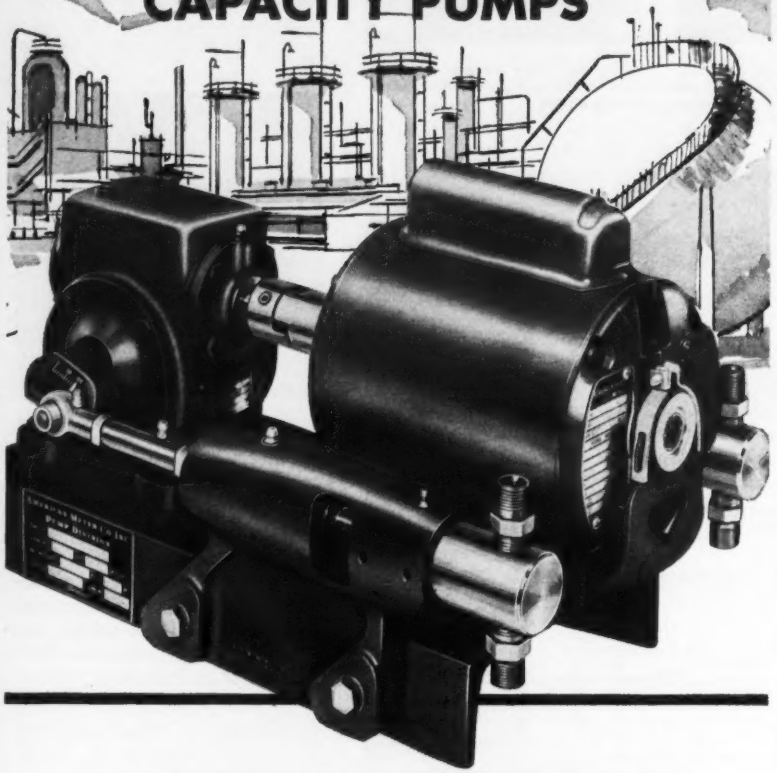
Check 1712 opposite last page.

Petrochemical expansion of $24,500,000 slated for Argentina

Industries Plasticas Argentinas Koppers, S.A., (IPAK), a company in which Koppers International, C. A. has a substantial interest, announced today that it proposes to construct a styrene monomer plant near Buenos Aires, Argentina. The plant will have a capacity of approximately 15,000 metric tons per year and will cost approximately $7,500,000. Styrene will be available for manufacture of polystyrene and synthetic rubber. Earlier IPAK announced plans to build a $17 million ethylene and polyethylene plant near Buenos Aires.

NEW

AMERICAN CONTROLLED CAPACITY PUMPS



JOB ENGINEERED FOR LONG-TERM ACCURACY AND LOWEST MAINTENANCE COSTS

New American controlled capacity pumps are precision built to meet the needs of Chemical Processing, Refining and Boiler Feed applications. Quality construction assures highest accuracy in feeding precisely metered fluids or slurries into low or high pressure systems in virtually all desired ratios, with flow, temperature, pressure, conductivity, PH and other controlled process variables. Control may be manual or automatic—with electric, hydraulic or pneumatic systems.

Newly designed models are available to handle a wide variety of "tough," corrosive and viscous materials.

Write today for full information on American's new controlled capacity pumps. They're sure to meet your fluid proportioning requirements.

AMERICAN METER COMPANY
INCORPORATED ESTABLISHED 1836
pump division
13500 PHILMONT AVE., PHILADELPHIA 16, PENN.

Check 1713 opposite last page

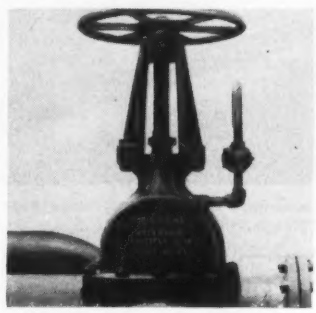
PETROCHEMICALS

Positive line shutoff, greater economy for gate valve

Uses: Unit is for aromatics, hydrocarbons, and LPG.

Features: According to manufacturer, unit offers, in effect, four separate seals — two precision metal-to-metal seats and two secondary O-ring seals. This insures positive line shutoff with greater economy than conventional installation.

Description: Multiple-seal gate valve operates same way as any conventional gate valve



Tightness of shutoff in multiple-seal gate valve can be proven by means of bleeder connection incorporated in valve bonnet

with rising stem, but because of its precision metal seats and O-ring seals, valve is closed hand-tight only and no snipe should be used.

Valve is made of cast steel with stainless steel trim. All face-to-face dimensions, wall thickness, and flange dimensions conform to ASA specifications.

(Mutiple-Seal Gate Valve is product of Vernon Tool Co., Ltd., 1101 Meridian Ave., Alhambra, Calif.)

Check 1714 opposite last page.

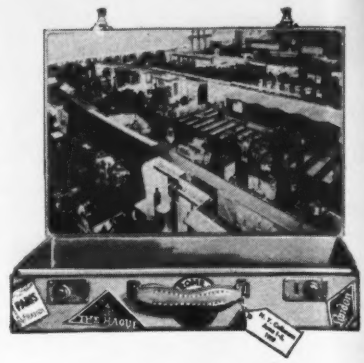
Tank gages for measurement of liquid levels any distance away from vessel are discussed in eight-page bulletin. Bul 945 — Uehling Instrument Co., Paterson, New Jersey.

Check 1715 opposite last page.

Temperature controllers of the non-indicating type are described in eight-page booklet. Bul MC-177 — Fenwal Incorporated, Ashland, Mass.

Check 1716 opposite last page.

In The U. S. A. For The First Time



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the newest products, materials and services

Whatever your interest—oil research, production, refining, transportation—you will find many valuable new ideas presented at this fact-filled exposition.

See and discuss new developments with technical representatives from 275 leading concerns. Plan now to attend . . . with your key men.

For advance registration and hotel information, write the Exposition at 480 Lexington Avenue, New York 17, N. Y. 1273

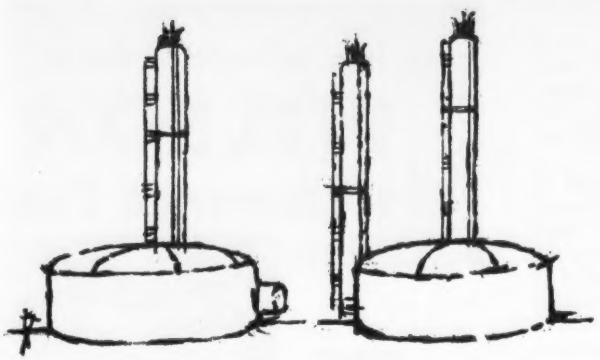
5th

WORLD PETROLEUM CONGRESS EXPOSITION

N. Y. COLISEUM
JUNE 1-5, 1959

Management: International Exposition

Check 1717 opposite last page



Several hundred thousand dollars saved by storing ammonia at atmospheric pressure

Refrigeration keeps ammonia pressure low, permitting use of thinner metal for tanks — this being the major factor responsible for substantial savings in capital costs

GORDON WEYERMULLER, Petrochemical Editor
with **IRVING C. ROTH,** Administrative Assistant
Cooperative Farm Chemicals Association
Lawrence, Kansas

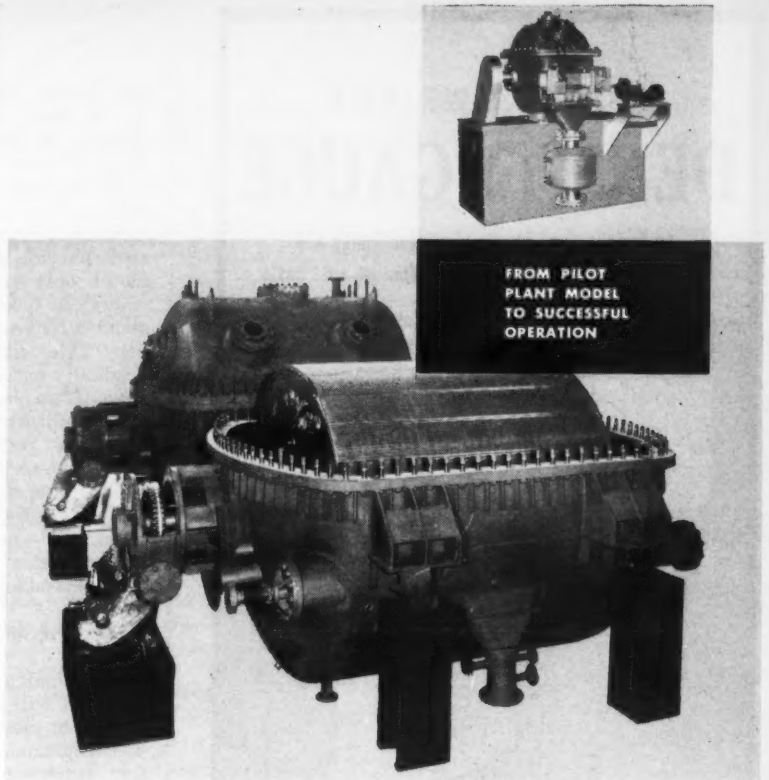
Problem: Cooperative Farm Chemicals Association was faced with problem of finding most economical method for storage of 15,000 tons of ammonia. Plant is presently adding 100 tons/day to ammonia production capacity. In conjunction with this expansion, additional storage for ammonia was needed because of seasonal nature of fertilizer business.

A method was also sought of recovering ammonia from letdown tanks in the anhydrous form — in which it could be used most advantageously. Under previous system these ammonia vapors had to be used in ammonium nitrate and were not available for production of nitric acid or urea.

Solution: Calculations were made on two possible methods of storing the 15,000 tons of ammonia. One of these would have involved the building of seven or eight conventional spheres, each of which would hold 2000 tons of ammonia under pressure.

Second method was to build two 100′ diameter x 48′ high, self-supporting, dome-roof tanks and refrigerate these tanks so the ammonia would be stored at atmospheric pressure. Calculations showed that with 6000-8000 tons to be stored, two methods appeared to be about equally advantageous. However, at 15,000 tons, the atmospheric method was definitely the more economical. Hence, this method was decided upon.

The two large dome-roof tanks are being built now and are scheduled to be placed in service in August 1959. They



G-B Rotary Drum Pressure Filters for HIGH PRESSURE

This new filter was originally developed for the lubricating oil industry where high pressure is necessary to keep the solvents used from flashing. The two units shown above were recently installed in a foreign country for a propane dewaxing plant.

This filter has now been adapted for other uses such as high energy boron fuels, refractory materials and other high pressure, high temperature applications. It is available from 6 sq. ft. to 400 sq. feet and in pressures to 150 psig. Stainless steel, monel or nickel construction may be used in addition to mild steel. A 6 sq. ft. pilot plant model in stainless steel is available for rent as shown in the inset above.

GB

GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM, ALABAMA

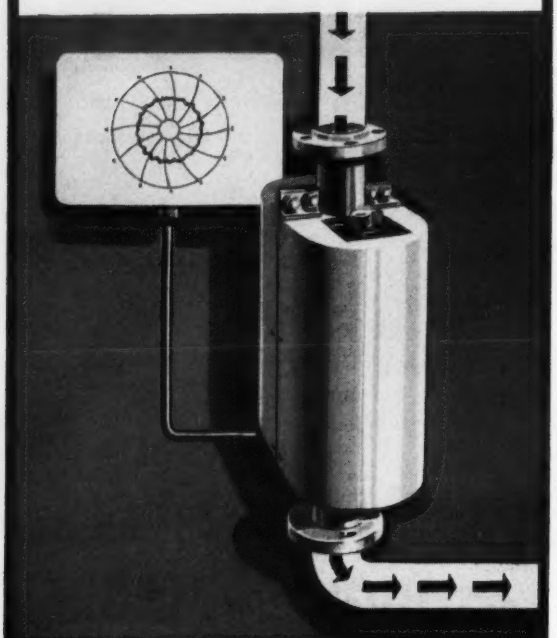
FILTERS • EVAPORATORS
PROCESS EQUIPMENT
CONTRACT MANUFACTURING
including HEAVY CASTINGS

Check 1718 opposite last page

CURTISS-WRIGHT

DENSITY GAUGE

An "on-the-line" density check for liquids and free-flowing solids that speeds production, cuts costs



Now you can *know* that your product is up to standard concentration—can for can, bottle for bottle, package for package. The Curtiss-Wright Density Gauge, mounted on pipes or other carriers from ½" to 36" in diameter, provides continuous reading and recording of the density of any free-flowing material.

Using radiated nuclear energy from a sealed source, not touching the product, the gauge can read the density—record—and automatically control it.

Either of the two designs—one for light, another for heavy industry—may be located remotely. Advanced Curtiss-Wright engineering provides long-term reliability—minimum maintenance.

WRITE FOR FULL DETAILS TODAY

INDUSTRIAL CONTROLS DEPARTMENT
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CORPORATION • CARLSTADT, N.J.

Check 1719 opposite last page

are being fabricated of a special grade of carbon steel suitable for low temperatures. They will be shipped to the plant as plate and welded on site.

Since they are designed as atmospheric storage vessels, metal only has to be thick enough at the bottom to withstand a hydrostatic head of 17 psi. This internal pressure gradually becomes less as distance from bottom increases. Hence, thickness of metal is gradually reduced going up the sides. A pressure vessel would have had to have been 1½ to 2" thick. Since the atmospheric vessels will be much thinner, this results in a considerable saving of metal.

Pressure Control

In designing the two vessels, pressure will have to be controlled to close limits. Special considerations were required for instruments to control pressure and these were applied in an unusual manner in design. It is important that the storage vessels be insulated and have a reflective surface to aid in control of pressure.

Ammonia Vapors

System is being designed to store liquid ammonia at −28°F and atmospheric pressure. Ammonia vapors in anhydrous form are condensed and returned to storage. Noncondensibles are burned as fuel. Procedure involves refrigeration, selective condensation, and cooling of gases.

Results: Use of the atmospheric storage vessels will save Cooperative Farm Chemicals several hundred thousand dollars in capital costs. This saving is being achieved through the use of thinner metal, fewer vessels, and less piping. Integration of new storage system with existing facilities will save some power for compression.

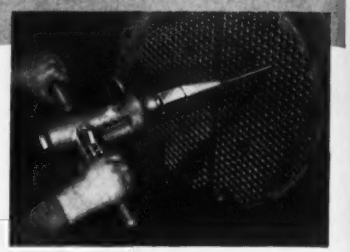
(Atmospheric ammonia storage and recovery system was designed and is being built by Chemical Construction Corporation, 525 West 43rd St., New York 36, N.Y.)

Check 1720 opposite last page.

Keep Heat Exchangers on the Line with

WILSON Maintenance Tools

Heavy-Duty TP-301 Cleaner



Positive air-driven, hollow rotary shaft, drill type tool. Tube is scavenged with air or water while cleaning.

Tube Expanders

Wilson Models 41 and 44 Tube Expanders incorporate an improved, adjustable ball bearing thrust collar and are designed for efficient, easy rolling and maximum roll length adjustment for various tube sheet thicknesses.

Torq-Air-Matic Expander Control

New Wilson Torq-Air-Matic is the first and only air-driven tube expander drive that accurately controls tube expansion by directly measuring torque output at the mandrel.

Tube Cutter

Wilson tube cutter is easy to use and does a fast job. Cutter sizes and shanks available to meet all heat exchanger requirements.

Write today for your copies of Wilson Tube Cleaner catalog No. 77 and Wilson Tube Expander catalog No. 88.

Representatives in principal cities
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WILSON TW068

TUBE CLEANERS • TUBE EXPANDERS

Check 1721 opposite last page

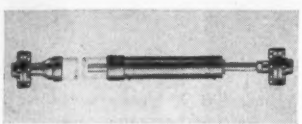
Hydraulic vibration snubber resists shock loads instantaneously

Gradual, natural expansion also accommodated

Uses: Stabilization of, and tension and/or compression reduction, in pipe systems.

Features: Snubber resists shock or vibration loads instantaneously. In addition, gradual movement is accommodated.

Description: Hydraulic vibration snubber consists of four components. Non-rotating, flexible, ball-type strut joint is welded to vibrating member. A length of schedule



Hydraulic vibration snubber restrains dynamic vibration

40 pipe, furnished by user, is coupled to strut joint and to hydraulic cylinder. Cylinder contains oil-based fluid.

Rod running from piston in cylinder is threaded into second strut joint which is welded to resisting member.

Snubber is not a dampner which merely **decelerates** movement. (Deceleration combines **time** with movement.)

Gradual movements, such as thermal expansion and/or contraction, are accommodated by bypassing fluid in snubber cylinder through restricted orifice in piston.

Snubber is offered in 2½" size with load capacity of 7000 lb and 4" size with load capacity of 20,000 lb.

(Hydraulic vibration snubbers are product of Barco Manufacturing Company, 500 N. Hough St., Barrington, Ill.)

Check 1722 opposite last page.

Oil-free compressors for a variety of industrial uses is subject of 12-page publication. Bul A-44 — Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.

Check 1723 opposite last page.

How to cut costs and get longer service from rubber products

Specify rubber goods made of Du Pont neoprene or HYPALON®! They outlast products made with ordinary rubber. For example:

HYPALON lined pump casings show no evidence of corrosive attack after one year service in caustic soda-chlorine manufacturing unit. Natural rubber failed within two months.

Neoprene pipe linings in cooling water return line in a refinery have served for over two years. Other linings failed within a year when exposed to water containing 18,000 ppm. salt and traces of oil.

HYPALON hose has carried hypochlorite since May, 1954. Other hose broke down in a few months.

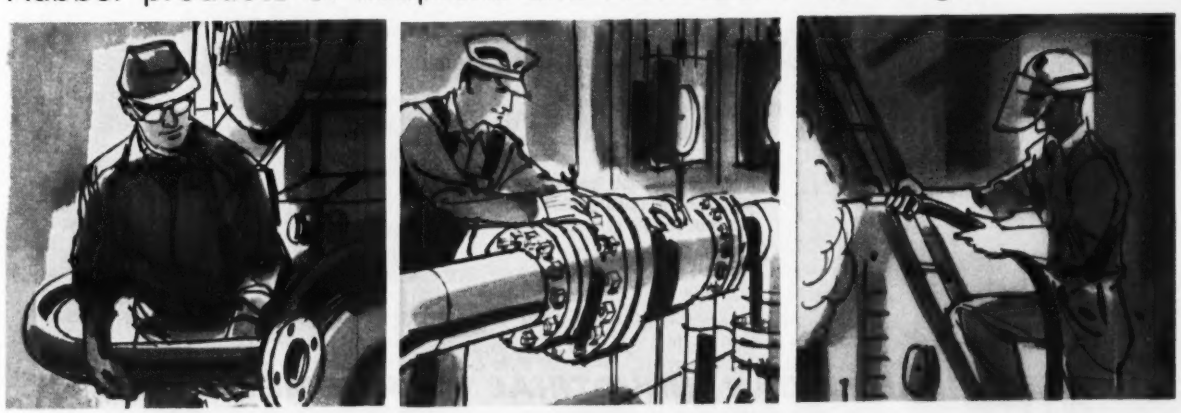
Neoprene sleeve valves have been exposed to 265° F. steam and submerged in soda ash storage tanks since 1955. Maintenance costs have been reduced.

Maintenance products of neoprene and HYPALON offer economy . . . longer service per dollar, reduced replacement costs, minimum downtime.

Neoprene and HYPALON assure lasting durability and excellent resistance to a wide range of deteriorating factors. Neoprene is a versatile synthetic rubber, with good resistance to oils and greases, most organic and inorganic chemicals. HYPALON is a special-purpose synthetic rubber which is heat-resistant, ozone-proof and impervious to most oxidizing chemicals.

Your local rubber goods distributor carries maintenance products of neoprene and HYPALON. He can recommend the right product to meet your needs. Call him soon. For more information write for "Du Pont Elastomers in Industry," E. I. du Pont de Nemours & Co. (Inc.), Elastomer Chemicals Dept. CP-5, Wilmington 98, Del.

Rubber products of neoprene and HYPALON last longer



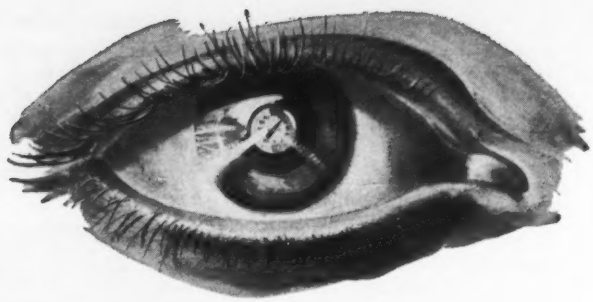
DU PONT REG. U. S. PAT. OFF.

SYNTHETIC RUBBER

NEOPRENE
HYPALON®
VITON™
ADIPRENE®

Better Things for Better Living . . . *through Chemistry*

Check 1724 opposite last page



What you read is right

The new, patented Maxivision dial on American Bi-Metal Thermometers eliminates the perspective effect of usual pointer-above-dial construction. No parallax! Readings are sure, sharp and accurate – exact working temperatures are always right before your eyes. It is a two-level dial. A raised outer ring, set close to the cover glass, carries the graduations. The index type pointer is on the same plane as the outer ring, with the numerals on a lower level.

What you read is right when American Bi-Metal Thermometers with anti-parallax Maxivision dial are installed at important check points on your processing facilities. Mounting styles, dial sizes, temperature ranges and stem lengths are available to meet the most exacting requirements. Let your nearby industrial distributor help you select the best combination for each location.

American Bi-Metal Thermometer with Maxivision Dial. Suitable for indoor or outdoor service.

MAXWELL MANNING & MOORE M&M TRADE MARK

AMERICAN INDUSTRIAL THERMOMETERS

A product of

MANNING, MAXWELL & MOORE, INC.

Consolidated Ashcroft Hancock Division • Stratford, Connecticut
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

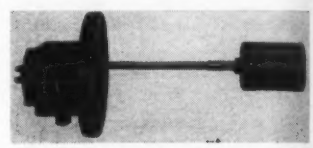
Check 1725 opposite last page

Liquid level control is accurate, dependable

Uses: Unit may be used for high or low limit switches to sound alarms, flash signal lights, start or stop fluid transfer pumps, or to operate control valves.

Features: Use of flexure-tube principle makes controller accurate and dependable.

Description: Unit is simply designed and can be easily adjusted. Controller uses a positive displacement float. Float is made of solid syn-



Controller is ideally suited for use on calibrated tanks

thane disc. This type of float cannot fill with liquid or collapse.

Control is especially suited for use on calibrated tanks. Once a tank has been volume calibrated, the controller may be installed and adjusted to provide control action at the exact calibration marks on tank. This is accomplished by the simple adjustment of an eccentric screw located inside switch housing.

(Mico-O-Flex Controller is product of Instruments, Inc., PO Box 556, Tulsa, Okla.)

Check 1726 opposite last page.

Polypropylene to be made by French companies

License agreements were recently signed to produce polypropylene in France under Montecatini-Ziegler patents. The French industrial groups of Pechiney and La Societe Normande de Matieres Plastiques are undertaking the venture.

Two plants of 22,000,000-lb capacity each will be built in France to produce the plastic. Construction is to begin immediately. It is anticipated that plants will go on stream in 1960.

THAT'S INTERESTING

Putting rein on radiation

Anti-rads will make for safer landings of nuclear-powered aircraft of the future despite exposure of tires to fairly strong doses of radiation. The anti-rads are chemical materials added to rubber stocks before vulcanization. They improve rubber's resistance to radiation damage, will double life of plane tires in radiation service, says *B. F. Goodrich Co.*, Akron, Ohio.

Up in the air

In Cape Town, South Africa, a steel and concrete roof is being built over the new railroad station. It will have a surface of 14 acres, will be used as a parking lot. After completion expected next year, part of roof also may serve as bus terminal

For more information on product at right, specify 1727 see information request blank opposite last page.

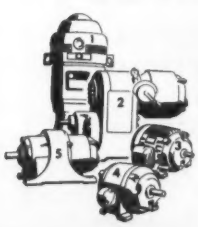
NEWS!
NEWS!

a vertical pump motor *designed* for industrial use!

U.S. UNIBASE pump motor
...with exclusive MICROSET coupling

Designed to simplify pump maintenance and minimize down time in industrial short-coupled service, the new U.S. UNIBASE MOTORS make it easy to handle the replacement of pump seals and other recurring maintenance operations. Large side opening gives unhampered access to coupling. Ingenious coupling spacer arrangement eliminates necessity of dismounting motor to replace pump seal. Exclusive U.S. MICROSET COUPLING makes accurate fine adjustment of pump impellers quick and simple without coupling disassembly. Rigid, rugged UNIBASE is *one integral package*, factory tested for true alignment and concentric mounting... and delivered as a unit. UNIBASE MOTORS available in Type HV-1, dripproof, 7½ to 125 H.P.; Type JV-1, Totally-Enclosed; Type EV-1, Explosion-Proof. For short-coupled turbine pump applications, specify: "U.S. UNIBASE MOTORS."

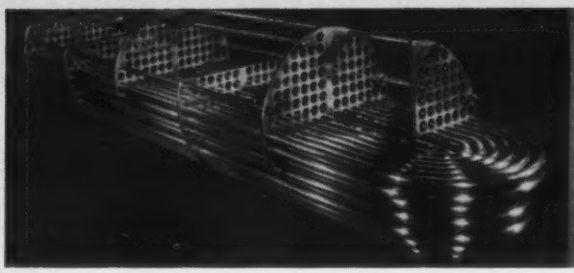
FREE COLOR BROCHURE
For Full Information, send for Unibase Bulletin No. F-1975



U.S. ELECTRICAL MOTORS INC.

P.O. BOX 2058
LOS ANGELES 54, CALIFORNIA
OR MILFORD, CONNECTICUT

U.S. MAJOR MOTOR LINES INCLUDE:
1. Vertical Solid & Holloshaft, 2. Varidrive, 3. Totally-Enclosed, 4. Uniclosed, 5. Syncrogear. Also, many other special motors.



CONDENSER AND HEAT EXCHANGER CLINIC

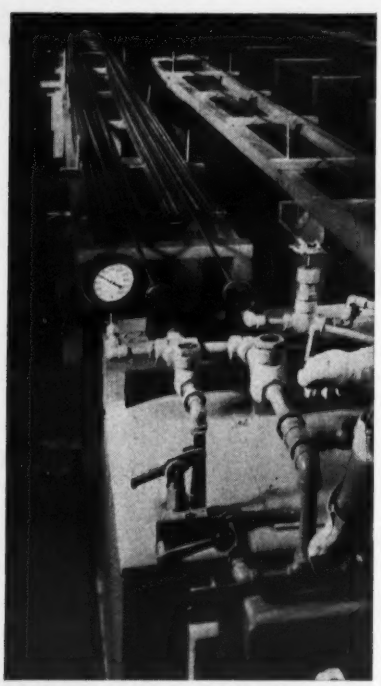
Edited by David S. Hibbard, Metallurgical Engineer
The American Brass Company, Buffalo 5, New York

New controls and services meet increasingly critical requirements in heat-transfer units

As steam cycles in turbines become more complex—and operating temperatures and pressures rise—the job of the heat-transfer equipment becomes increasingly critical. Nuclear energy plants place tremendous emphasis on continuity of service for even conventional components like condensers. And in many processing plants the cost of shutdowns may range from exorbitant to disastrous.

Assurance that tubes will meet service requirements becomes increasingly important. And The American Brass Company has augmented its normal quality controls with tests and services to help makers of heat transfer equipment prevent possible trouble before it starts.

Electronic inspection. All tubes are inspected visually one at a time, both internally and externally. However, where greater assurance is required, the tubes—in straight lengths up to 100′—can be inspected electronically by eddy-current equipment.



All U-bend tubes are tested hydrostatically at ASME Code pressures—or higher, if necessary.

All tubes are inspected visually one at a time, both externally and internally.

When required, tubes are inspected by eddy-current equipment, located at the tube straightener.

Hydrostatic testing. As most U-bend tubes are used in applications involving high temperatures and pressures, all of these tubes are tested hydrostatically—after bending—at ASME Code pressures. They can, however, be tested at higher pressures, up to 6000 psi, if the tube size is such that it will withstand the pressure.

Relieving stresses. All U-bend tubes, other than copper, are annealed at the bend area after bending, to eliminate the hazard of stress-corrosion cracking which might occur in service due to stresses that may exist as a result of the bending.

Duplex tubes are widely used in chemical plants and petroleum refineries to meet diverse combinations of corrosive action and/or pressure and temperature. Recently designers have selected them for use in air-removal sections of electric-power-plant condensers where corrosion is very severe.

Broadest service. In helping manufacturers and users of heat-transfer equipment meet day-to-day problems, The American Brass Company has a broad background in the latest developments in heat-transfer equipment's expanding role. And with new mill equipment now in place, it offers the broadest service available in tubes for heat-transfer equipment. For technical assistance in special problems, write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 5958

ANACONDA®

TUBES AND PLATES FOR CONDENSERS and HEAT EXCHANGERS

Made by

THE AMERICAN BRASS COMPANY

Check 1728 opposite last page

PETROCHEMICALS

Double-seal ball valves resist 28" Hg vacuum and 3000 psi

Used in variety of services at Goodyear

Double-seal ball valves are being used by The Goodyear Tire & Rubber Company, Akron, Ohio, in services in latex operations, on high-pressure water service, and in handling of soap in conjunction with reactors.

Ball valve on 3000-psi water service at ambient temperature

Latex installation includes 6" valve in drain line on bottom of tank and two 2" valves in sampling line, to hold 28" Hg vacuum while samples are obtained. Temperature here is approximately 90 to 110°F.

In water-service a ¾" valve is used on 3000-psi line at ambient temperature.

(Double-seal ball valves are product of Jamesbury Corporation, Worcester, Mass.)

Check 1729 opposite last page.

Flow Check Snubber, which prevents pressure instrument failure and hazard to plant personnel, is detailed in two-page publication. Unit will withstand pressures up to 30,000 psi. "Flow Check Snubber" — Chemiquip Company, 36 East Tenth Street, New York 3, New York.

Check 1730 opposite last page.

Use of digital computer in the petroleum industry is discussed in detail in four-page bulletin. Bul IB-018 — Bendix Computer Div., Bendix Aviation Corp., 5630 Arbor Vitae St., Los Angeles 45, Calif.

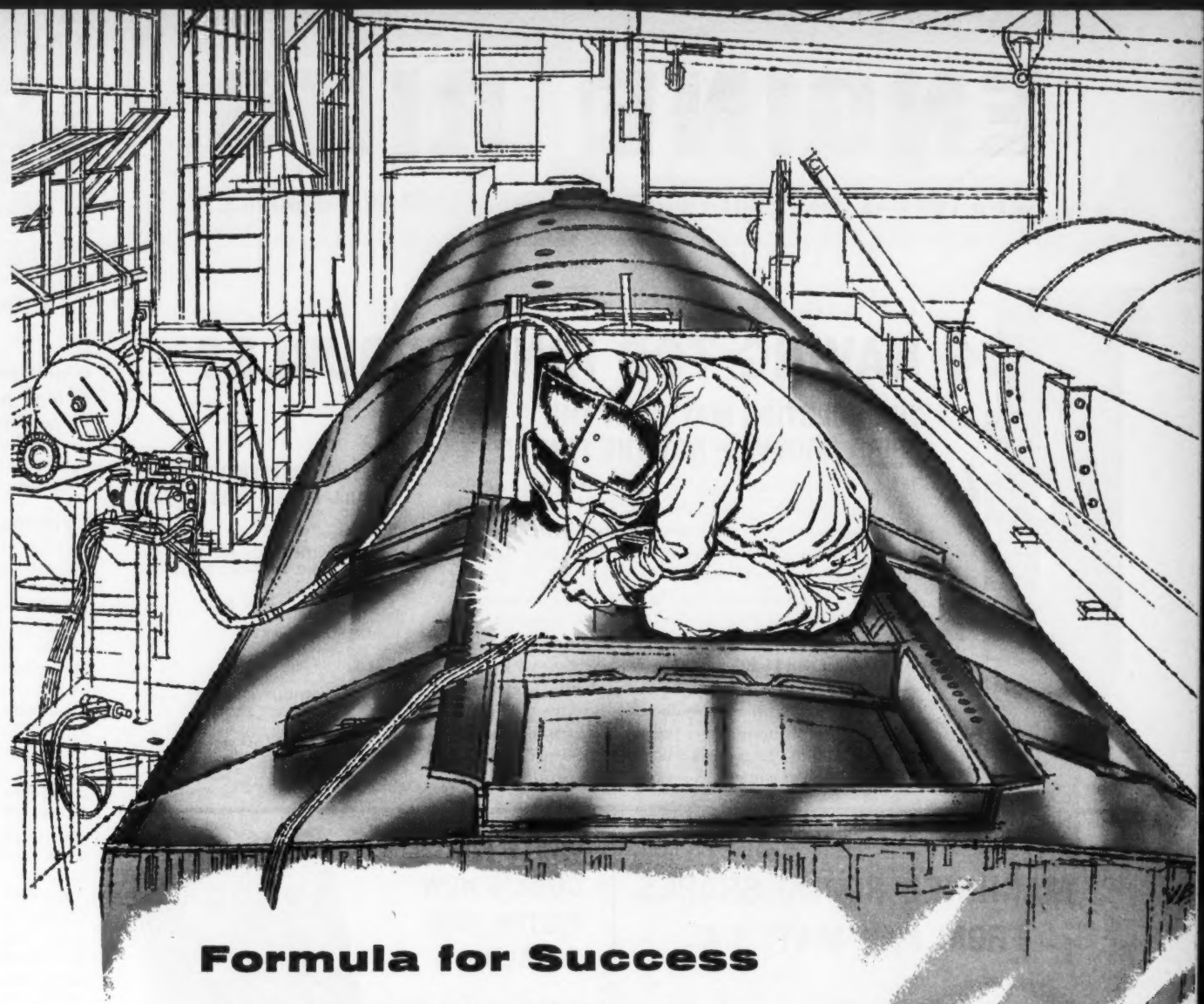
Check 1731 opposite last page.

THAT'S INTERESTING

Musical dentistry

An acoustic technique for reducing or eliminating pain of a dentist's drill has been developed by scientific teamwork between a dentist and a psychologist. The device presents a combination of music and noise controlled by the patient. Called an "Audio Analgesiac," device has earphones for patient, who listens to music of his choice reproduced in high-quality, 3-D effect much like stereo. Patient holds control box which has two knobs. One varies music volume; other turns on and controls volume of random noise which sounds much like Niagara Falls. At high volume, noise blots out sound of drill.

For more information on product at right, specify 1732 see information request blank opposite last page.



Formula for Success

The formulation of a stainless steel alloy requires as much precision as any chemical compound. All the care exercised in the selection of a particular alloy can be nullified by variations in the analysis specified.

During fabrication, for example, slight differences in chromium-nickel: carbon ratios can cause changes in microstructure which lead to early failure.

That's why it is safer to specify J&L Consistent Quality Stainless Steel. J&L leads the industry in melt shop standards for stainless steel—the point where quality starts, **and longer service life begins.**

Plants and Service Centers:
Los Angeles • Kenilworth (N. J.) • Youngstown • Louisville (Ohio) • Indianapolis • Detroit

J&L STAINLESS
SHEET • STRIP • BAR • WIRE

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Box 4606, Detroit 34

ENGINEERING

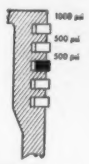
NEWS YOU CAN USE ABOUT ENGINE AND COMPRESSOR PERFORMANCE

← HAVING TOP RING TROUBLE?

THE SOLUTION MAY BE IN THE THIRD GROOVE — NOT THE FIRST!

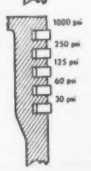
If you've had trouble with your top piston rings (excessive groove wear, groove damage, ring breakage, etc.) you won't need to be convinced that the top ring carries from 50 to 80% of the sealing load. Installing top rings of special, expensive materials is often not the answer. They may be shock-resistant but generally lack adequate wearing qualities. One likely solution is installation of a Cooktite sealing ring in the THIRD groove to relieve the load carried by the first ring. In an engine with a compression pressure of 500 psi and a firing pressure of 1000 psi, a Cooktite ring in the third groove will reduce the pressure differential on the top ring from a trouble-causing 750 psi to an easily-handled 500 psi. Ask a C. Lee Cook representative to explain in detail.

PRESSURE DIFFERENTIAL AT FULL FIRING PRESSURE



WITH COOKTITE SEALING RING IN THIRD GROOVE

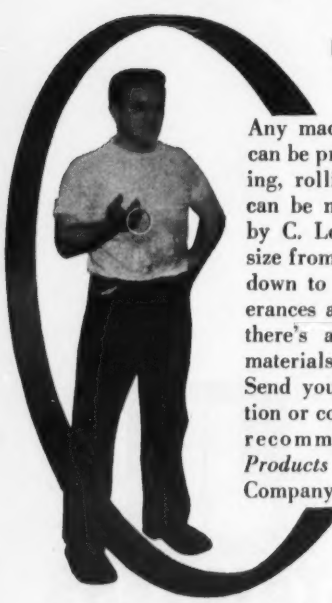
500 psi



WITHOUT COOKTITE RING IN THIRD GROOVE

750 psi

MACHINED ROUND SHAPES FROM ANY MATERIAL



MADE TO YOUR BLUEPRINTS

Any machined round shape that can be produced by turning, milling, rolling, lapping or drilling can be made to your blueprints by C. Lee Cook Company. Any size from 1" to 60", with finishes down to 4 micro-inches and tolerances as close as .0002". And, there's almost no limit to the materials that can be machined. Send your blueprints for quotation or contact us for engineering recommendations. *Airtomic Products Division*, C. Lee Cook Company, Louisville 3, Ky.

WRITE FOR COOK'S NEW PISTON RING CATALOG

Sixteen-page catalog just off the press. Describes complete line of piston rings manufactured by C. Lee Cook Company, also the special rings of the Airtomics Division. For your free copy, write: C. Lee Cook Company, 932 South 8th Street, Louisville 3, Kentucky.

C. LEE COOK COMPANY

Division of Dover Corporation

Rings and Packings Since 1888

Check 1733 opposite last page

PETROCHEMICALS

Protective coatings for use from sub-zero to temperatures up to 2000°F are covered in 40-page booklet on preventive maintenance products. Chemical water treatments, solvent cleaning methods, and other subjects of interest to the petroleum industry are included. "Preventive Maintenance" — Xzit Chemical Company, 158 14th Street, Hoboken, N.J.

Check 1734 opposite last page.

Triplex pumps impervious to high-pressure attacks by corrosive liquids

Losses of production time greatly reduced

Problem: At Houston, Texas, plant of a large petrochemical manufacturer, excessive maintenance of pumps and corresponding production losses were caused by attack on pumps by corrosive caustic and brine solutions under high pressures.

Solution: Three direct-flow, 1⅝ x 5" stroke triplex pumps were installed. Working barrels and suction and discharge manifolds are made of forged Monel. Valves and plungers are made of K Monel. Valve seats are constructed of Stellite.

Results: Pumps supply caustic and brine on 'round-the-clock basis dependably at 3000 psi. Maintenance requirements have decreased, and pumping production is greatly improved. Pumps have not had any serious breakdowns.

(Triplex pumps are product of Aldrich Pump Company, 1 Pine Street, Allentown, Pa.)

Check 1735 opposite last page.

Flotation systems designed to accomplish difficult liquid-solids separations are covered in eight-page brochure. Bul SM-1003 — Process Engineers, Inc., Division of The Eimco Corp., 420 Peninsular Avenue, San Mateo, Calif.

Check 1736 opposite last page.

Valves, including cast steel gate, globe, angle, and swing check types, are described in 20-page booklet. Bul KS-1 — Kerotest Manufacturing Company, 2525 Liberty Ave., Pittsburgh 22, Pa.

Check 1737 opposite last page.

ADVERTISEMENT—*This entire page is a paid advertisement* *Prepared by U. S. Industrial Chemicals Co.*

U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

Soluble Sodium Complexes Prove Valuable for Wurtz Reactions and Metalations

It has been found that some aromatic hydrocarbons will form highly reactive soluble complexes with sodium in certain "active" ethers. These complexes are very useful for carrying out many metalation reactions and condensations of alkyl and aryl halides (Wurtz reactions).

Among the hydrocarbons found useful are naphthalene, diphenyl, the terphenyls and anthracene. The "active" ethers include dimethyl ether, methyl ethyl ether, dimethyl ether of ethylene glycol and tetrahydrofuran.

MORE

By proper choice of hydro-

Armed Forces Outline Still-Unsolved Chemical Problems; Call for Help

The National Inventors Council recently published a report titled "Inventions Wanted by the Armed Forces," discussing military needs for certain types of materials which cannot as yet be supplied for technological reasons. The report calls for the chemist's assistance in providing:

(1) waterproofing compound for gages that will be flexible from −20 to 140°F and bond to anything.

(2) metal-to-metal adhesive, good up to 600°F, with a shear strength of 2,500 psi minimum.

(3) adhesive for explosives which can be applied down to −40°F; hold a 2½-lb. block of explosive on a vertical square for 60 days, using about 15 sq. in. of block surface; support the block on a variety of dirty, wet or uneven vertical surfaces.

(4) easy method for growing large, single silicon crystals of uniform lifetime, resistivity and dislocation density.

(5) quartz crystal units in the 1-100 mc range, able to operate from −55 to 90°C without more than 5 ppm deviation from nominal frequency.

(6) method of making colored smokes which would reduce the present 80-90% dye loss due to decomposition.

Copies of the report can be obtained at no charge from the National Inventors Council, U. S. Dept. of Commerce, Washington 25, D.C.

New Process for HCl Said to Yield Economies

A preliminary German patent, DAS 1-035-626, claims that hydrochloric acid can be made very economically in a plant consisting of a single tower lined with graphite-based, corrosion-resistant material.

As described, the process consists of burning hydrogen and chlorine in a bell-shaped reaction chamber at the bottom of the tower. The resulting acid, as a gas, passes through slits in the chamber and travels up through an absorbent, noncorrosive packing. Water or dilute acid drips down, cooling the tower walls and the reaction chamber, and is concentrated at the same time.

Ethylene Is Basic Raw Material For Giant Chemical Complex

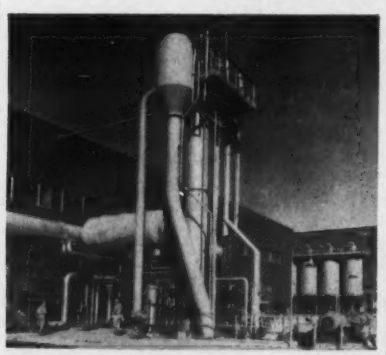
U.S.I. Uses Versatile Chemical 6 Ways: to Make Alcohol, Polyethylene, Ethyl Chloride, Ether; for Refrigeration In Its Own Manufacture; for Sale in Cylinders.

Ethylene is probably the most valuable petrochemical building block available to the CPI today. Almost four billion pounds were produced and used in 1957, and it is estimated that production capacity last year was about five billion pounds. At Tuscola, Ill., a huge complex of chemical plants — turning out a wide variety of large-volume products — has been erected on the foundation of a plentiful ethylene supply. Here, several natural gas pipelines from the Southwest join at a compressor station which feeds extraction and fractionation facilities. The ethane fraction from these facilities, converted to ethylene, becomes the "jack-of-all-trades" at the Tuscola complex.

The values of ethylene are its low cost and its ability to polymerize or react by addition with simple and inexpensive materials, such as hydrochloric acid, oxygen and chlorine, to yield extremely useful intermediates or end products. At Tuscola, ethylene is used for synthesis of polyethylene, ethyl alcohol, ethyl ether and ethyl chloride. A small portion is employed in the ethylene purification plant for refrigeration. It is also bottled under pressure in steel cylinders and sold as a ripening and conditioning agent for fruits and vegetables, as a chemical raw material, and as a refrigerant. (A new technical data sheet gives commercial specifications for U.S.I. refined ethylene, properties of the pure compound, and use data. Copies can be obtained upon request on company letterhead.)

100 Million Pounds of Polyethylene

Of the 500 tons of ethylene produced at Tuscola each day, a third is polymerized to polyethylene. Ethylene raw material for this process is brought to a very high purity in a separate step which employs the ethylene gas itself as a refrigerant. Converting ethylene to polyethylene requires two steps. The gas is compressed under extremely high pressure and pumped into the polymerization reactor, where it is held at high pressure and moderately high temperatures. A catalyst is added to start the reaction. The polyethylene formed flows to a separation system where unreacted gas is removed. Low and intermediate density resins are produced by this process at Tuscola's 100-million-pound-per-year polyethylene plant.



U.S.I. ethylene unit supplies 100-million lb.-per-year polyethylene plant at Tuscola, Ill.

Ethanol, Ether and Ethyl Chloride

Recycled ethylene, as well as fresh make-up from the ethylene unit, feeds into the ethyl alcohol facility where it is absorbed in sulfuric acid and then hydrolyzed under controlled conditions to yield 190-proof and anhydrous alcohol. This synthetic alcohol plant is among the country's largest and supplies alcohol raw material for a large segment of the American chemical industry. Ethyl ether is a by-product of the same process. In another plant, by reaction with hydrochloric acid, more ethylene is converted into ethyl chloride — sold for production of tetraethyl lead and other products.

Ethylene in cylinders is sold by U.S.I. for food processing, as a refrigerant, and as a chemical raw material.

Advantages of Integrated Production

The Tuscola operation could, if the demand arose, produce other ethylene derivatives such as ethylene oxide, ethylene dichloride and ethylene chlorohydrin. The integrated plant permits great economies in the production of all derivatives. Ethylene not used in making other U.S.I. products is sold in cylinders.

Over the last few years, as the market for polyethylene has soared, ethylene production capacity at Tuscola has been doubled. If activity within this integrated chemical complex is any indication, the demand for ethylene as a chemical building block should certainly reach and exceed the 6.5-billion-pound mark now being predicted for 1965.

★ U.S.I. CHEMICAL NEWS ★

CONTINUED *Sodium*

carbon and active ether, reaction conditions may be so chosen that no interference from the solubilizing components will be noted. The rate of formation of these soluble sodium carriers is much more rapid and complete with sodium dispersions than with massive sodium. Sometimes dispersions are made directly in these aromatic hydrocarbons.

A soluble complex will transfer sodium from the carrier to another organic compound with the regeneration of the hydrocarbon carrier. The hydrocarbon then promptly solubilizes additional sodium. Thus only a catalytic amount of hydrocarbon is required.

As an example of this very useful technique, bibenzyl in dimethyl ether can be prepared from benzyl chloride using a sodium dispersion solubilized in naphthalene and terphenyl. The reaction is demonstrated by the equation:

$$2\text{ø}CH_2Cl + 2\,Na \rightarrow \text{ø}CH_2CH_2\text{ø} + 2\,NaCl$$

benzyl chloride — bibenzyl

Details of this preparation are given in U.S.I.'s brochure "Sodium Dispersions," available on request.

Another interesting application of sodium complexes is the use of sodium and naphthalene for etching "Teflon" resin surfaces so that the "Teflon" resin can be bonded to other materials.

Experimental Fuel Cell Converts Chemical Energy Directly to Electricity

A compact, experimental gaseous fuel cell recently developed converts chemical energy from an external source into electrical energy directly and instantaneously. There are no heat engine losses, and so the cell has a theoretical 100% efficiency. In trial runs, a 24-volt cell was used successfully to light two 15-watt electric light bulbs.

The fuel cell contains electrodes and an electrolyte, and hydrogen and oxygen are used as the fuel gases. Hydrogen is catalytically ionized at the anode — releasing electrons to the external circuit — and reacts with ions in the electrolyte. Oxygen is ionized at the cathode — absorbing electrons from the external circuit — and reacts with the electrolyte to replace the ions used at the anode and to form water. As a result, electrons flow through the external circuit at a voltage characteristic of the chemical reaction—and light the lamps.

Polyethylene Reflector Used in Training Reactor

A small sub-critical reactor, with a core 10 inches in diameter by 14 inches long, is being used as a teaching aid at the University of Texas, to train future nuclear scientists in the use of radiation equipment and the characteristics of reactors.

The reactor uses two types of reflectors — polyethylene and graphite — with thicknesses varying from three to ten inches. During study, students will put a uranium core inside the reflector and add a neutron source. Although neutrons will be multiplied by the core, they will be retained by the reflector. When the source is removed, multiplied neutrons will die out. There is no danger to students, unless they come in close contact with the neutron source.

Uranium core being inserted into polyethylene reflector of training reactor at University of Texas (photo courtesy of Lockheed Aircraft).

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Bacterial inhibitor for cutting oil emulsions and coolants now on market is claimed to extend emulsion life two to four times. Material is combination of bacteriocides thimerosal and sodium o-phenylphenate. **No. 1460**

New polyethylene tank for corrosive solutions contains inner polyethylene basket to hold parts to be dipped. Tank is 12" x 26" x 12". Basket, 6" x 24" x 3", has half-inch holes for contact between parts and solution. **No. 1461**

Instrument to measure internal corrosion and record it hourly is now available. Said to detect as little as one millionth of an inch of corrosion electronically. A dual-element probe provides the measure. **No. 1462**

Lange's Handbook of Chemistry in revised, updated ninth edition can now be purchased. New material has been added, some tables are completely rewritten, many numerical values have been changed to bring them up-to-date. **No. 1463**

Rates of rusting in different parts of country are compiled in index now available. Cities with populations over 10,000 are listed, with times to rust standard, uncoated steel test panel. Index is result of 25-year research. **No. 1464**

Heavy polyethylene coating is now being used on matched weighing papers for analytical balances. Advantages claimed include cleanliness, inertness, ease of washing contents into volumetric flask, low cost. **No. 1465**

New suction device for filling pipettes can now be obtained. Designed for operation with one hand . . . thumb presses rubber bulb at top to provide suction, forefinger operates coarse air control valve. **No. 1466**

Protective coatings are subject of new bulletin. Easy-to-read table lists each coating—its description, general use, primer, number of coats, cautions, max. use temperature, colors, surfaces for coating, wear properties, chemical resistance, method of applying. **No. 1467**

Heavy-duty polyethylene bag in 5-gallon drum being used to pack reagents such as sodium and potassium hydroxide, phosphoric acid, formaldehyde and liquid chelating agents. Package is disposable, easy to handle and store. **No. 1468**

New amphoteric surfactants now in commercial production are salts of N-alkyl beta-amino-propinates. They can be either cationic or anionic and are suggested for cosmetics, shampoos, cleaners, emulsifiers. **No. 1469**

PRODUCTS OF U.S.I.

ORGANIC SOLVENTS AND INTERMEDIATES

Ethylene, Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethyl Sodium Oxalacetate, Sodium Ethylate, ISO-SEBACIC® Acid, Sebacic Acid, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P., Pelargonic Acid, 2-Ethyl Heptanoic Acid.

OTHER PRODUCTS

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Riboflavin USP, Intermediates.

Heavy Chemicals: Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sodium Sulfite, Sodum Sulfate.

Alcohols: Ethyl (pure and all denatured formulas); Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL PR.

PETROTHENE® Polyethylene Resins

Animal Feed Products: Antibiotic Feed Supplements, BHT Products (Antioxidant), Calcium Pantothenate, Choline Chloride, CURBAY B-G®, Special Liquid CURBAY, VACATONE®, Menadione (Vitamin K_3), DL-Methionine, MOREA® Premix, Niacin USP, Riboflavin Products, Special Mixes, U.S.I. Permadry, Vitamin B_{12} Feed Supplements, Vitamin D_3, Vitamin E Products, Vitamin E and BHT Products.

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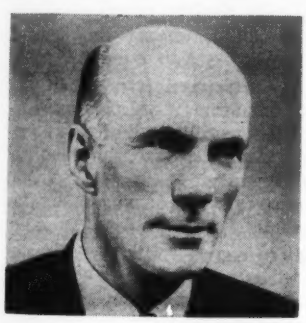
Right To Work

From page 25

rapidly seeing through the phony character of these laws as is testified to by the beating such measures took in five states during the last election.

However, states currently are invited to pass such laws under the terms of Sec. 14 (b) of the Taft-Hartley Act. This is the paradox. The Act permits unions to bargain with employers on the union shop question. In the next breath, however, it permits the states to override the Federal intent. Therefore, I have introduced a bill in the Senate (S. 769) to eliminate the destructive qualities of Sec. 14 (b). ■

CHARLES R. SLIGH Jr.
Executive Vice President
National Association
of Manufacturers



Mr. Hartley, in his article, very effectively demolishes every argument advanced by union leaders in opposition to "right-to-work" laws. It is now quite clear that the barrage of baseless charges and deliberate distortions is intended by those leaders to hide their lust for monopoly control over all workers.

They challenge our traditional belief that freedom of choice — in this case freedom to join or not to join a union or any other organization— is

For more information on product at left, specify 1738 . . . see information request blank opposite last page.

Engineered WEIGHING SYSTEM NEWS

HYDRAULIC CELLS "NATURALLY" DAMPEN OUT OSCILLATIONS OF VIBRATORY LOADS

Precision weighing of a vibratory load poses a troublesome problem for the instrument man. This is particularly true if the oscillations of the vibrations are irregular in both magnitude and time.

Where effort is made to use electrical load cells to do this job, filters are employed. In many instances, the drift of the filter is greater than the desired measurement.

Engineering-wise it is a well-known fact that oil has within itself the natural property of dampening out vibrations. This, plus the proper engineering of tubing and valves, make the Emery Engineered Weighing System the most effective method available today for solving the problem of dampening out troublesome vibrations to give precision weighing of vibratory loads.

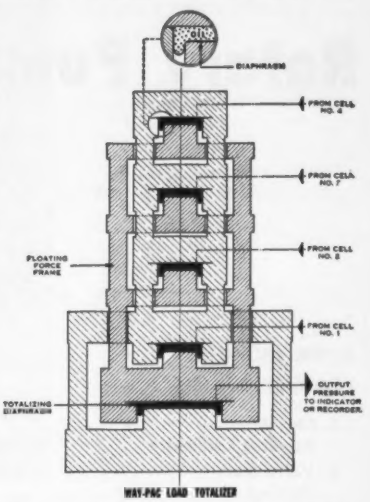
When writing, refer to Item 1009

WAY-PAC LOAD TOTALIZER UNIT COMBINES HYDRAULIC CELL LOADS

The new, simple, self-contained Emery WAY-PAC Load Totalizer Unit, a device for combining the loads on two, three, or four WAY-PAC Cells, has a sensitivity of 1 part in 5,000 and will accept the maximum capacities of both the 1,000 lb. and the 5,000 lb. cells. It is shock resistant, weather-proof, and is not affected by temperature variations.

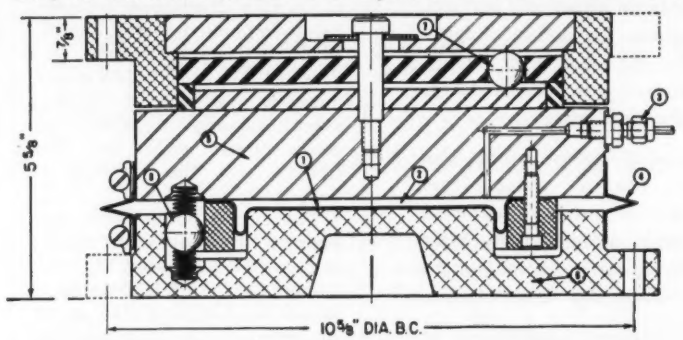
Measuring 9½" in overall height, the totalizer contains diaphragms each of which exerts a load on a floating force frame. The force frame, in turn, exerts this total load on the totalizing diaphragm where it is again converted into a combined output hydraulic pressure which represents the combined load on two, three, or four WAY-PAC cells. All types of indicating, recording and controlling instrumentation may be used in conjunction with the WAY-PAC Load Totalizer.

When writing, refer to Item 1006



The new WAY-PAC Load Totalizer combines the loads on two, three or four WAY-PAC Load Cells.

WAY-PAC HYDRAULIC CELL LINE IS NOW EXPANDED TO 5,000 LB. CAPACITY



1 DIAPHRAGM 2 OIL 3 OIL FITTING 4 PROTECTIVE BOOT (neoprene)
5 BAR STOCK ALUMINUM 6 CAST ALUMINUM 7 ROLLING BALL 8 POSITIONING BALLS

Cross section of the new 5,000 lb. capacity WAY-PAC Compression Cell with the exclusive Emery "rolling ball head" (Type AC-5-RB).

The recently-introduced line of Emery WAY-PAC Hydraulic Load Cells has now been expanded to include capacities of 5,000 lbs. The original WAY-PAC line was limited in its rating up to 1,000 lbs.

The WAY-PAC 5,000 lb. cells are similar to the previous 1,000 lb. cells in manufacture but the new dimensions are different. Included in the line are: the AC-5, Compression; the AC-5-RB, Compression with "rolling ball" head; the AU-5, Tension; the AT-5, Cable Tension; and the AD-5, Strut Cell. The same instrumentation which teams up so well with the 1,000 lb. series works equally well with the new 5,000 lb. line.

When writing, refer to Item 1008

NEW 19½" DIAL INDICATOR WILL IMPROVE ACCURACY OF CELL PRESSURE READINGS

Taking pressure readings with increased accuracy is much easier with the new Emery 19½" dial indicator. Previously, the largest dial offered measured 16½" in diameter.

Since the basic objective of dial reading is accuracy, our 19½" indicator makes possible greater accuracy than ever before. Because of the larger scale length, graduations can be better matched to the job. Easy and accurate readings are a basic advantage with the new Emery 19½" indicator.

When writing, refer to Item 1007

The A. H. Emery Co., New Canaan, Conn.
I am interested in the following:
Item 1006 ☐ Item 1008 ☐
Item 1007 ☐ Item 1009 ☐
Seeing Representative ☐
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Company .....
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THE A. H. EMERY COMPANY
New Canaan, Conn.
Engineered **WEIGHING SYSTEMS**

Check 1739 opposite last page

MOST COMPLETE LINE

Eleven Product Groups Serve Every Sealing Need

GROUP NO. 3

Rotary Pump Packings

Belmont offers 22 different Packings for centrifugal and rotary pumps—to answer the wide variety of requirements of this important packing application. Constructions include braided long fibre Canadian and blue African Asbestos, copper and lead inserted asbestos, cotton, flax, Teflon yarn and molded shredded-Teflon pump packing rings. Lubricants include special oil and solvent impervious compounds for petroleum products, non-staining lubricants for paper mill service, edible lubricants for food plant services, Teflon suspensoid for positively non-contaminating services in dairy, food and chemical services.

In addition, Belmont offers the "Chemical" Seal—a rotating mechanical seal of pressure-balanced Teflon Bellows design with greater immunity from corrosion, and longer useful life than any other design.

See your Belmont Distributor or write for the name of one nearest you.

OTHER BELMONT PRODUCT GROUPS

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2. Valve Stem Packings
4. Criss-cross Braided Packings
5. Hydraulic Packings
6. Bel-Vee V-Rings
7. Sheet Packings
8. Gaskets
9. Metallic Packings
10. Plastic Packings
11. Expansion Joints

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The Belmont Packing and Rubber Company
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Check 1740 opposite last page

Right To Work

From preceding page

just as fundamental a part of our American way of life as are freedom of speech, freedom of religion, or freedom of the press.

The Nebraska Supreme Court said it well when it held:

"We also think the right to work is one of the most precious liberties that man possesses. Man has as much right to work as he has to live, to be free, to own property, or to join a church of his own choice, for without freedom to work the others would soon disappear . . ."

Labor leaders would arrogate to themselves the power of economic life or death over millions of employees who would be left helpless without any legal recourse or protection.

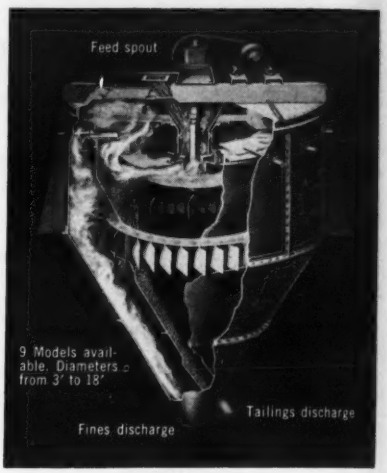
It is truly paradoxical that after having fought long and bitterly for statutory assurance of a man's right to join a union without losing his job, these leaders now fight savagely against a similar guarantee of a man's equal right to earn a livelihood without being compelled to pay tribute to union bosses. It is incredible to think that such a guarantee is needed in a country constitutionally dedicated to every man's right to "life, liberty and the pursuit of happiness."

The union hue and cry against "right-to-work" laws is an open confession that the unions and their leaders have failed to convince the great majority of American workers that union leadership is more interested in the workers' welfare than it is in achieving complete economic control of their very lives. Any organization which requires compulsory membership in order to survive is obviously not operating in the best interest of its members or the general public.

The most convincing evidence that "right-to-work" laws are *not* union-busting devices is the fact, as cited by Mr. Hartley, "that percentage increase in union membership has been greater in these states which have "right-to-work" laws than in those which do not." ■

Size Requirements Getting Tougher?

Sturtevant Air Separators Increase 40 to 400 Mesh Output as Much as 300%



Closed-circuit air separation is of proved advantage in reduction processes. Result is a better, more uniform product. Grinding mills perform at top efficiency, output frequently increases as much as 300%, power costs drop as much as 50%.

Precise separation of all dry powdered materials. Sturtevants currently classify sulfur, soybeans, phosphate, chocolate, feldspar, sand and aggregates, pigments, limestone fillers, flour, abrasives, plastics, gypsum, ceramics, cement and other products.

Improve screening — Sturtevant Air Separators prevent blinding by removing undesirable tailings *or* fines from screen feed loads.

Works Like Winnowing Done in a Whirlwind

Sturtevant Air Separators do a mechanical job of winnowing. Precise control of whirlwind air currents and centrifugal force results in the desired size being lifted into fines cone, oversize falling into tailings cone.

A 16 ft. Sturtevant, for example, has taken a feed rate of 800 tph, containing only a *small* percentage of desired fines, and delivered 30 tph 90% 200 mesh, recirculating the oversize through the grinding circuit.

Send for Bulletin No. 087.

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MILL COMPANY
119 Clayton St., Boston, Mass.
Crushers • Grinders • Micron-Grinders • Separators
Blenders • Granulators • Conveyors • Elevators

Check 1741 opposite last page

Scheduling

From page 26

and destinations up to the capacity of the computer. By making slight modifications in input data, the technique can be made quite flexible as to any pre-set conditions used.

Principal disadvantage of the transportation technique is that it is an iterative one which may involve an extremely large number of steps before the optimum solution is reached. Even with a computer, a solution to a relatively small problem may require several hours.

Use of the transportation technique and the consequent use of the computer would be satisfactory if basic factors such as supply and demand remained constant. Unfortunately, Dow has never found this condition to exist.

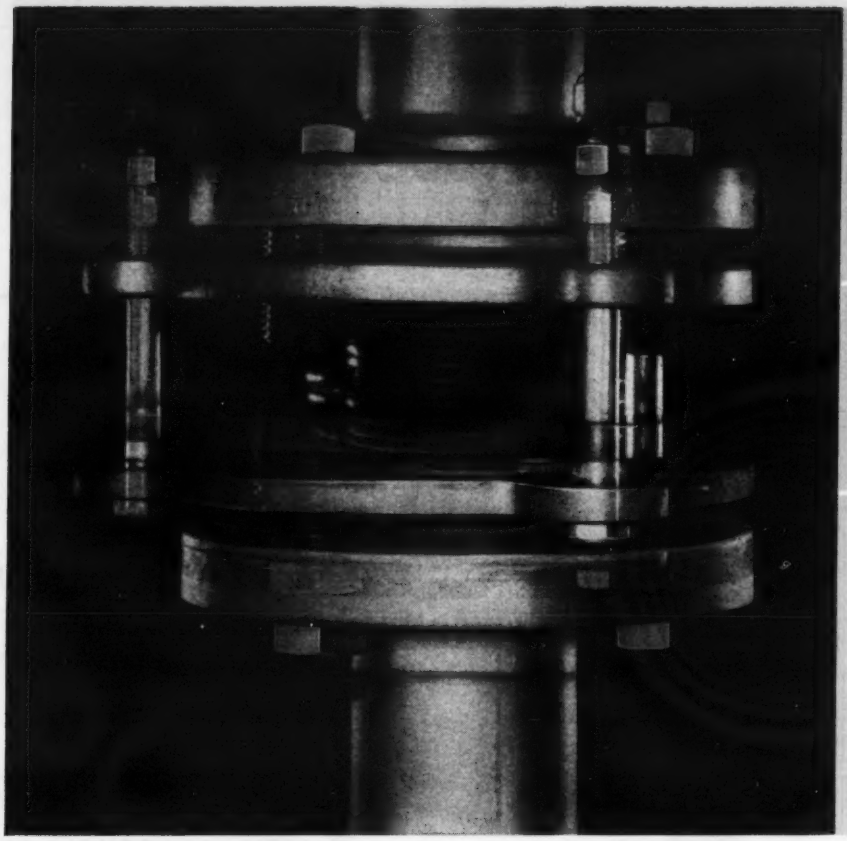
Factors change, and they often do so very unexpectedly and quite radically. Many times the answer to a scheduling problem is needed right away, and it is impossible to wait until the problem has been set up and run on the computer.

Also, if a computer were used every time there was a change in the factors, the cost of using the computer would probably offset any of the resultant savings in distribution costs.

Because of these impracticalities in using the transportation technique for day-to-day scheduling, Dow has developed ranking techniques. An example of the simplest type of ranking table is shown in the table.

This table is a ranking be-

"Dissatisfied with us, Pemberton?"



MOLDED DESIGN
rounded interior convolutions, extra thickness at stress points
HIGH TENSILE STRENGTH
Teflon at its best, Fluoroflex-T provides at least 300% elongation
METAL REINFORCING RINGS
permit greater travel from shorter units, prevent distortion from surges

2 MILLION CYCLES AND STILL FLEXING!

...proving that this Teflon expansion joint—molded of Fluoroflex-T —outlasts most other materials and constructions

Chemical manufacturer: Tried Fluoroflex®-T joint, found it *still* flexing after *2 million cycles;* previously had averaged 100,000 cycles from machined Teflon® flex joint in pumping application.

Major industrial product company: Displaced one end of a special Fluoroflex-T bellows ¾-inch from its axis, rotated it around axis at 1,000 rpm. After *20 million cycles*, with still no sign of deterioration, test discontinued.

Petrochemical processor: Installed Fluoroflex-T joints to replace joints machined from Teflon. The Fluoroflex-T joints are still in service after nearly a year.

Fluoroflex-T flex and expansion joints perform so much better for three reasons: (1) *The material:* a patented compound of Teflon that combines high density with low crystallinity for optimum strength and flexibility. (2) *The process:* a unique technique for molding uniform convolutions with restraining rings. This gives undamaged grain structure, rounded interior convolutions and increased strength. (3) *The experience:* Resistoflex has been working with fluorocarbon resins since their inception. For fabricating with Teflon, such experience is *vital.* That's why Fluoroflex-T is Teflon at its best.

So, for corrosion-proof flex and expansion joints that give unsurpassed working life, specify Fluoroflex-T. Write for Bulletin B-1A. Dept. 236, RESISTOFLEX CORPORATION, Roseland, N. J. Other Plants: Burbank, Calif.; Dallas, Tex.

®Fluoroflex is a Resistoflex trademark, reg., U. S. pat. off.
®Teflon is DuPont's trademark for TFE fluorocarbon resins.

Complete systems for corrosive service

RESISTOFLEX

Check 1742 opposite last page

From preceding page

tween two supply points, "A" and "B." To make the table, the cost advantage of "A" over "B" is determined for each destination, which is then ranked in descending order of the advantage of "A" over "B."

It can readily be seen from the table that the optimum distribution pattern can exist when "A" has an availability of 49 and "B" has an availability of 25. "A" would supply the first eight destinations, "B" the remainder.

In the event "A" had an availability of only 20, the optimum distribution pattern would be obtained by allocating the first four destinations to "A" and the remainder to "B."

With more than two supply points, ranking techniques become more complicated. The same principle is used, however. With three or four supply points, ranking techniques have been developed which are not too complicated and which will yield the optimum distribution pattern. Calculations can be done by hand, using tables.

Near Optimum Pattern

For a greater number of supply points, ranking techniques have been developed which will yield a near optimum distribution pattern. Calculations can be done with the use of tables or the computer.

The time required on a computer is considerably less than that required to get a transportation solution to the same problem, and the difference in total distribution costs for the two methods is usually small enough costs for the two methods is usually small enough to ignore.

In many cases, it has proved helpful to predetermine optimum distribution patterns and resulting distribution costs for the range of availability conditions which might be expected within a period.

Results are plotted on graphs which can be referred to in determining the optimum availability levels and in finding cost penalties for making changes is availabilities. These

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Custom Engineered
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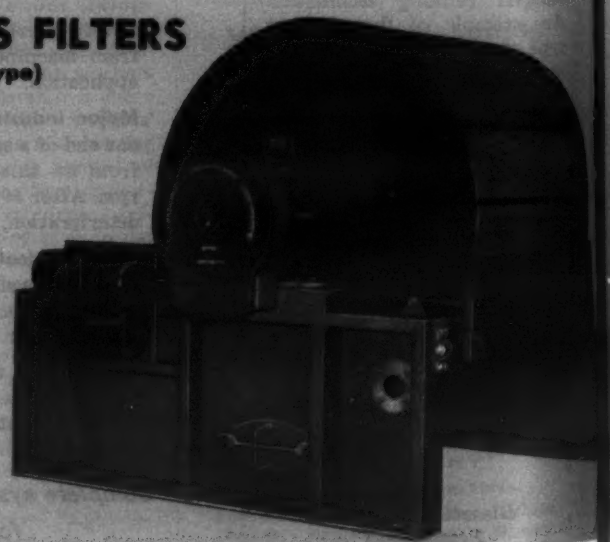
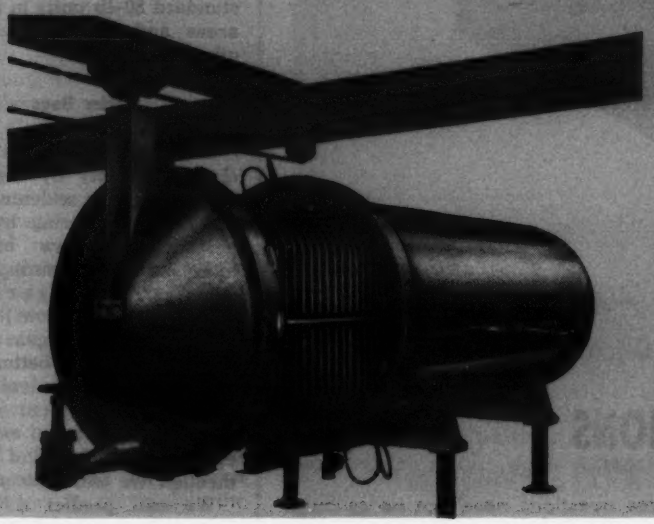


Solids Separation

PLETE UNBIASED SERVICE

Niagara® FILTERS



- VERTICAL LEAF MODELS in both horizontal and vertical tank designs.
- BATCH-MISER® horizontal plate models for polish filtration and batch operations.
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Available by the roll or tailored to fit all types of fluid/solid separation process equipment.

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FEON Woven Textile Fiber Fabrics
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EAST MOLINE, ILLINOIS

COMPLETE LABORATORY TESTING FACILITIES AT YOUR SERVICE

Check 1743 opposite last page

graphs can give the answer to a problem at a glance and eliminate making new computer runs every time a change in condition results.

To aid in shipping scheduling, economic shipping areas are delineated on maps which tell sales personnel at a glance where an order should be placed.

It is difficult to measure the savings Dow has achieved by using "scientific" scheduling as compared with "hunch" scheduling. Estimates for the different products studied have ranged from a couple hundred to several thousand dollars a month. What is important is that scientific scheduling has greatly reduced the possibility of cost errors, and consequently has helped assure the highest possible profit margins.

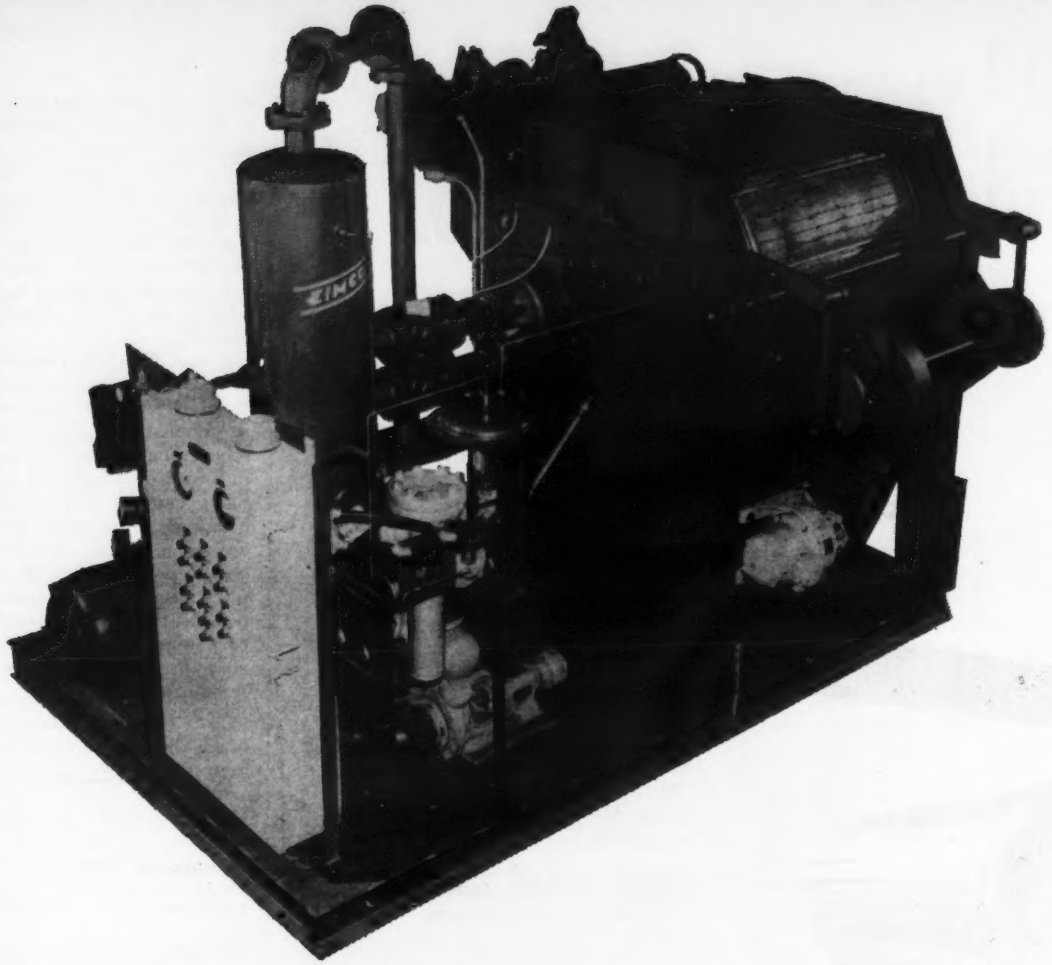
Personnel Testing

From page 27

formance is compiled, the man is interviewed by a psychologist and a series of tests (with Johnson execs as norm group) is given. The man is also rated by people on his own level within the company. An appraisal report is then made up. These reports are used in setting up a personal development program for the individual.

Future Plans

Generally, applicants and employees have taken a very favorable attitude toward Johnson's personnel testing procedures. The company is well satisfied with the program and as far as can be determined, it has been very successful. As new tests are developed and made available they investigate for possible use in the company's testing program. A continuing program of research to determine how well the tests are measuring what they're supposed to measure is part of the program.



PUSH BUTTON FILTER STATIONS

Now you can operate your filter station with push buttons. Controls are energized manually, and from that point on the various functions of the station are automatic within predetermined operational limits.

The success of such an automated filter station depends upon careful pilot plant study and analysis to determine the range of variables that the equipment must handle if it is to meet the full plant requirements: the limits of acceptable clarity, moisture content of dewatered material, amount of precoat feed and many others.

Answers to these questions need not be as much of a headache as they seem because that's where Eimco comes into it with it's Research and Development Center. With your permission we can take over the problem, work it out and present you with a workable station to produce your product.

Eimco has more experience solving difficult filtration problems and a more complete line of filtration equipment with which to solve filtration problems than any other manufacturer. For additional information write The Eimco Corporation, Salt Lake City, Utah.

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B-841 BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

Check 1744 opposite last page

Packaging Trends

From page 33

in popularity.

This is creating an intolerable situation where there are markets for a single product in various sizes. The added container cost for smaller units usually can be covered by an upcharge, but the manufacturer must adapt his packing line to handle all sizes. He also must adjust palletizing and loading patterns, must accept lower packing rates for smaller units, and maintain several inventories of empty bags and packed material.

One must predict that this situation will stabilize itself, with a cooperative assist from industry associations, to standard 80-lb units in certain areas and to 50-lb units in others.

Better Bags

We see definite signs of increased activity by bag suppliers, aimed at widening their markets by offering better performance (new barriers, more postitive closures, better adhesives, stronger paper, modified constructions) at reduced costs, and again by offering equal or better performance with less paper weight. Development of extensible paper is an excellent example of the type of breakthrough we can anticipate.

We can predict drastic changes in bag-making equipment. There is a definite need for versatility and elimination of costly changeover operations which are reflected in the cost of bags to the consumer. It is conceivable that an entirely new principle of bag making will be discovered which will make obsolete all present equipment.

Development of a new bag-making principle will have greater meaning than simple container cost reduction. If an operation uses large numbers of bags of one style and size, why should the processor not install a machine and make his own bags as needed?

Let's go a step farther. Appearance of a machine which takes bags from a magazine, fills and closes them, and discharges them onto a conveyor, all with pushbutton control, is

an unmistakable signpost pointing to complete automation of the packaging operation.

Add an automatic palletizer (already on the market), automatic conveying to storage or to shipping point (right into the vehicle, if you like), and one of our hypothetical machines to make bags and deliver them directly to the packer magazine, and you have a picture of what can be expected in the not-too-distant future.

The next step? Form the package around your product as accurately weighed increments are delivered to the mechanism. This will come.

Fiber Drums

Turning to fiber drums, we see a somewhat uncertain future. Other container types are steadily edging their way into fiber drum markets. As multiwall bag quality and performance improve, their substantial cost advantage will permit them to nibble away at the business which fiber drums previously had considered their exclusive territory.

The bulk box is having a field day because it can compete on an equivalent cost basis or better.

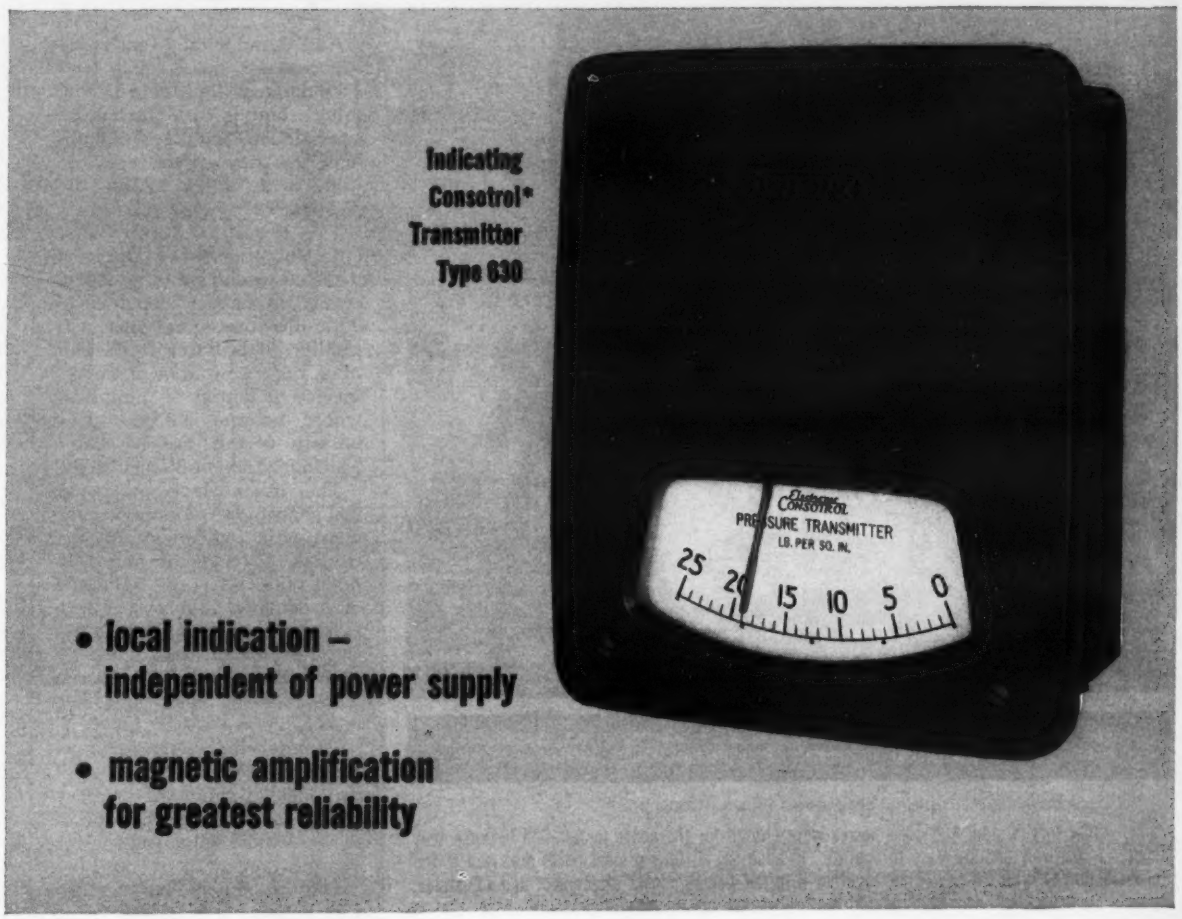
And the corrugated box may prove to be the toughest competitor. It can match the drum in volume or dimension, and can provide rigidity needed in many applications. Progress is being made toward providing reclosable features, vapor barriers, sift-proof construction, and other improvements in areas where the fiber drum now enjoys superiority.

Besides lower cost, the corrugated unit also can be shipped and stored in the flat.

Where, then, can fiber drums turn for new markets? What about fiber drums for liquid products? This, we believe, is the key to this container's future.

Although somewhat successful already in the liquid field, much remains to be done before fiber drums begin to approach their potential in this area. We predict improvements will come rapidly, ac-

versatile unit in Foxboro's exclusive 100% solid-state electronic system



An electronic transmitter, with local indication, for long-distance transmission of a wide variety of process measurements — that's the Foxboro Type 630 Consotrol Transmitter.

The Type 630 operates with standard Foxboro measuring elements. Its magnetic amplifier delivers a high level (10-50 ma) d-c signal — unaffected by a-c pick-up and ambient temperature variations. Indicator, and optional local alarms, work directly from mechanical primary element. Standard instrument is weatherproof — optionally available for use in hazardous area.

Write Foxboro today for Bulletin 21-10. It describes the Type 630 Indicating Transmitter in detail, as well as the many other instruments in the 100% solid-state Foxboro Electronic Consotrol System.

The Foxboro Company, 815 Neponset Ave., Foxboro, Massachusetts.

*Reg. U. S. Pat. Off.

Motion-Type Electronic Consotrol Transmitters:

FLOW AND LIQUID LEVEL
differential pressure diaphragm-bellows elements . . . ranges between 20 and 200 inches of water

PRESSURE
diaphragm, bellows, and bourdon-type elements . . . ranges between 10 inches of water and 80,000 psi

TEMPERATURE
liquid filled, vapor pressure, and gas filled thermal systems . . . ranges between −450F and +1000F

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ELECTRONIC CONSOTROL INSTRUMENTATION / for every function in the control loop

Check 1745 opposite last page

ORBIT VALVES

ORBIT VALVES shown in above picture are installed on ammonia loading dock, Lake Charles, Louisiana. Valves and piping are coated for protection against external corrosion.

Orbit forged steel ASA class valves were chosen for the above installation because they shut off positively and are easy to operate. In addition, all forged steel parts are used in the construction of Orbit valves — this, together with the welded bonnet attachment and adjustable, pliable stem packing and non-lubricated feature, makes up an integral pressure vessel that is the last word in safety and economy.

Please specify service intended when ordering Orbit valves. For other special applications, our industrial division will be glad to help you with your particular service problems.

Orbit valves have a long history of performance in: AMMONIA, HYDROGEN, NITROGEN and HYDROCARBONS. Watch these ads for additional facts about Orbit valves and recommended services.

SIZES: 1", 1½", 2", 2½", 3" and 4" ASA 300-lb thru 2500-lb, full opening flanged and screwed ends. Venturi opening available in sizes: 2", 2½", 3" 4" and 6" ASA 150-lb. thru 2500-lb. flanged ends only.

SOURCE: Through your favorite industrial supply house.

LITERATURE: Write Department B for Catalog 58-B.

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Check 1746 opposite last page

Packaging Trends

From preceding page

celerated by industry demand, more competition, and counter-measures taken by steel shipping container manufacturers.

Liquid Packaging, Handling

And now what trends are apparent in packaging and handling liquids? For one thing, liquids are far more amenable to handling in bulk than are dry solids, and the trend is definitely in that direction.

Two developments in liquid bulk shipping are of interest to large producers. One is the change in tanker capacities in both directions — larger and smaller. This latter trend will open up a new area of tanker service potential — suppliers whose volume did not previously permit use of water transportation bulk facilities.

The other development is the concept of pipeline movement which will inevitably introduce a powerful factor in plant site selections. Outside of producing your own intermediates, what could be more convenient and less costly than a pipeline over the fence with a surge tank and two meters?

Despite this trend to shipping in bulk, the 55-gal steel drum will remain the primary mover of liquid products of the chemical industry for years to come.

One recent move is the trend toward standardization of steel drums. So far, standardization has been applied to a relatively small number of drum types in most common usage, but eventually all drums and pails will be included.

Standardization simplifies palletization and tiering of drum pallets; it guarantees volumes within specified limits; it helps to stabilize tare weights of drums, although this variation always will be a function of variation in steel sheets themselves.

Greatest significance of this standardization to packaging lies in the fact that container uniformity is the first step toward completely automatic handling, filling, and closing on high-speed lines.

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Check 1747 opposite last page

A second trend in steel drums is toward lighter units. Extensive shipping tests have demonstrated that a drum with 18-gage heads and 20-gage sidewalls can do a completely safe and adequate job as a shipping container. Such a drum offers substantial savings in cost and in reduced freight bills because of its lower tare weight.

A third trend in steel drums has been development of resistant linings and improved methods of application of these linings to steel.

Here, again, there is great need for standardization. Too many linings are available from which to choose the one that will do the best job for a specific product. As new linings are introduced, old ones are not retired. Consequently, packaging people restrict consideration of linings to a relatively small group, selected on the basis of past experience and expediency.

In looking ahead, one can see the evolution of a mere handful of super linings, perhaps only one, to reach for the ultimate, which will provide complete protection (now lacking) for an indefinite time (now limited) for all products (now restricted) at uniformly low cost (now variable) all of the time (now uncertain).

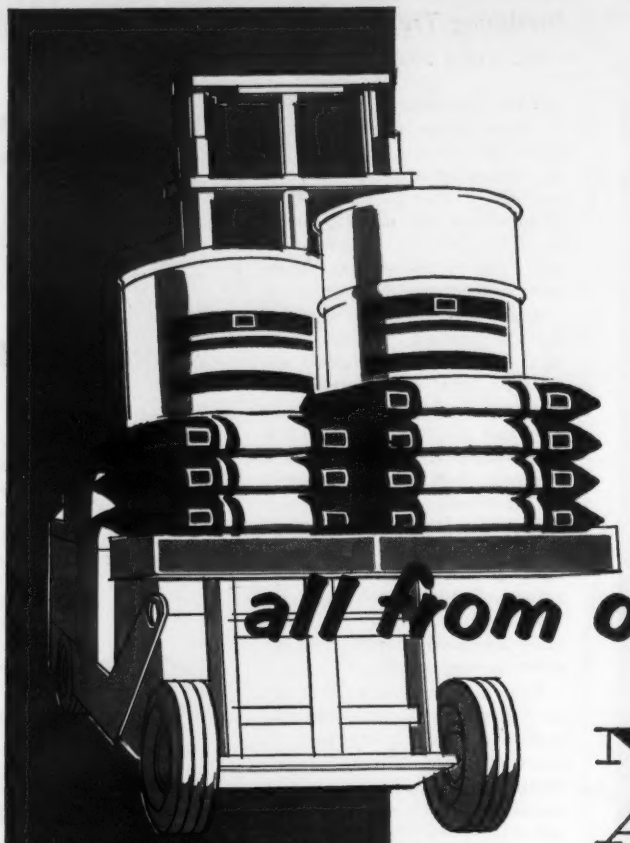
Plastic Containers

Thus far we have concentrated on paper and steel packages. Glass, wood, and other materials used to a relatively limited extent in industrial packaging do not offer a very broad field for speculation.

With plastic materials, however, the exact opposite is true. The potential of plastics as packaging material defies the imagination. Oddly enough, though, there is no single, well-defined trend which one can use as a basis for predicting its future.

In the field of rigid packages, we already have polyethylene drums and carboys. In the flexible field, we have polyethylene and polyvinyl-chloride bags.

There also are numerous plastic component parts in



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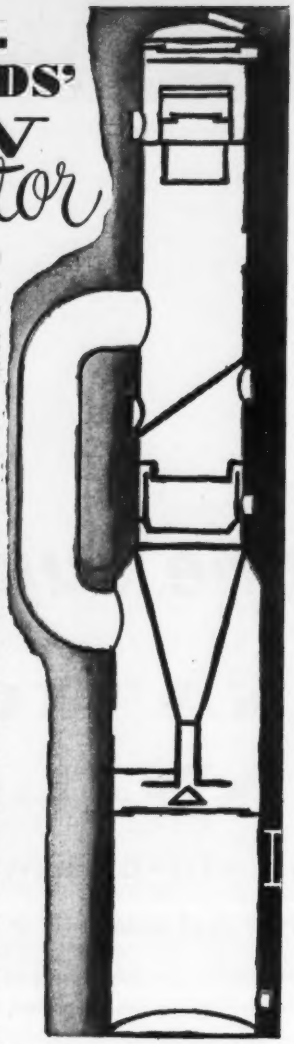
Check 1748 opposite last page

CROLL-REYNOLDS' NEW Convactor



If you never heard of a CONVACTOR, do not be surprised. It is an entirely new design of special condensing tower which offers important processing advantages.

In the refining of edible oils it recovers fatty acids, most of which were formerly waste. It offers another advantage of totally eliminating stream pollution from this source or the expense of cleaning cooling towers which collect such deposits. It has similar application in fatty acid stills, some other types of distillation processes, dryers, and other large vacuum processing units.

The CONVACTOR is a combination of two condensers and a vacuum cooling chamber. One condenser is of conventional barometric design, the other a highly improved condenser working on the jet principle. The latter condenses the vapor from the process and discharges directly into the vacuum cooling compartment for the immediate removal of condensation heat. The cold water is then recirculated through the same jet condenser. The flashed vapor from the cooling operation is condensed in a conventional barometric condenser using water from a river, cooling tower or other industrial source. Periodic blow-down or continuous bleed-off from the flash chamber permits recovery. Several large industrial installations have been made.

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Check 1749 opposite last page

Packaging Trends

From preceding page

standard industrial containers — drum plugs, multiwall-bag plies, fiber-drum and box liners, and so on and on. There is scarcely a container type which does not already have an all-plastic counterpart. And the surface has been merely scratched.

When one stops to consider the properties which have been built into synthetics already, and the unknown properties which will be built into the plastics of tomorrow — combinations of high strength, low weight, chemical inertness, any size, any shape, any property you want — it becomes almost academic to predict *what* the packaging of tomorrow will be. The real question is *when*, and the only defensible answer is *eventually*.

Cost is an obvious deterrent to the rapid inroads of synthetics in the packaging field. Another is the difficulty in attempting to displace that which is firmly established by something radically different despite the advantages which the latter may offer, particularly where large inventories representing capital investment would have to be written off.

Packaging Engineers

Now what of the men, the packaging engineers? Here, too, there exists a very definite trend.

True professional status is being accorded the packaging man. Various educational helps are being used to train him for his role as a specialist. Full-time university courses leading to a degree in packaging are being offered.

Many publications devoted to packaging are available. There has been an increase in cooperation among packaging profession members themselves.

More than training and education in their chosen field will be required of these packaging engineers. They will have to be skilled diplomats and practical psychologists. They will have the job not only of coming up with many new ideas on packaging, but also of selling those ideas to

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Check 1751 opposite last page

Sales, Promotion, Purchasing, Traffic, Industrial Engineering, Safety, and the other recognized corporate groups.

The packaging engineer must be able to talk with men at every level and be able to enlist enthusiastic cooperation in taking a new idea and making it work.

Management's Role

Finally, what is to be the role of management in this coming era of packaging? First and foremost, management must recognize that packaging is responsible for functions which cannot be arbitrarily assigned to other groups and departments for handling on a basis of secondary importance.

Packaging must earn such recognition by tangible demonstrations of value, and not rely on acceptance based on repeated protestations of its own estimate of worth.

Once having decided that packaging merits a separate place in the corporate structure, management must organize such a unit and provide the necessary supervision, manpower, and facilities for its proper functioning.

Present needs alone should not be the basis on which to determine whether or not a Packaging Department or simply a packaging man on the advisory staff or the periodic services of a consultant should be considered. Laying careful groundwork for future growth has a record of paying rich dividends.

Define Responsibility

Management has one further obligation — to define areas of responsibility within which the packaging group is expected to function. (This may include material handling, product distribution, packaging equipment, packaging research, labeling, container specifications, packaging standards, quality control, even purchasing of packaging material in certain cases.)

And having defined these areas, the necessary authority must be provided to permit the group to properly discharge its obligations.

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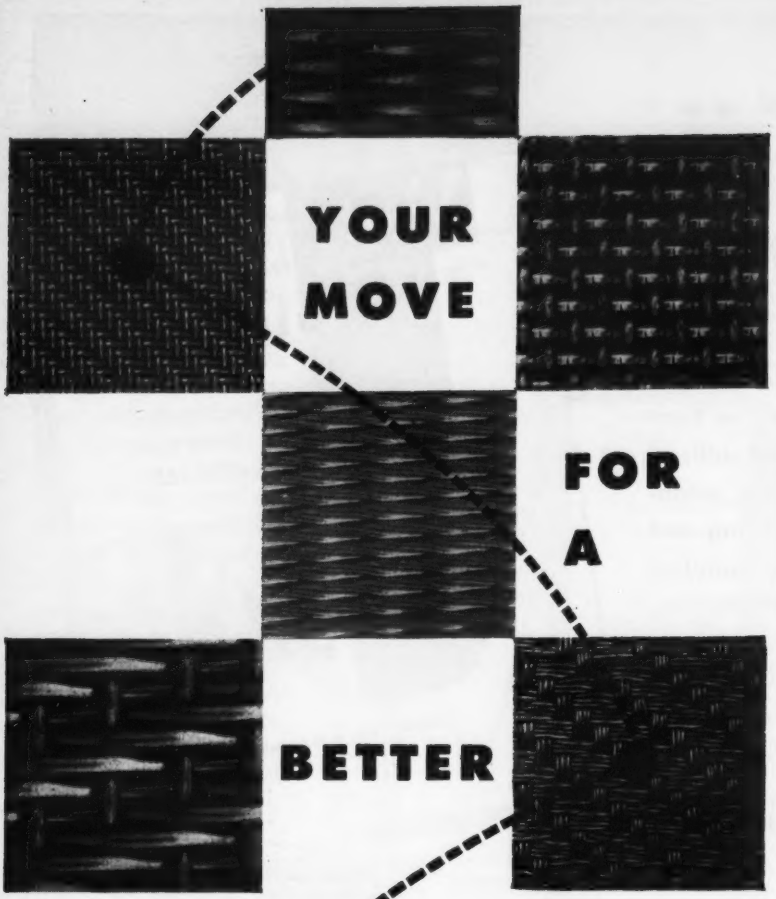

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Check 1753 opposite last page

Soda Ash Handling

From page 64

support was given to load-bearing axles and frame was strengthened.

One shuttle drive was repositioned from end to center of unit to aid in making 180° turn, and other minor modifications made to increase flexibility. If a spring belt fails, operations are not interrupted since conveyor will continue to function. Springs are replaced during shutdown.

Results: Efficiency, neatness, and quality of loading operations have been improved. Packing machine and flattener combine to provide compact packages with more uniform weights. Sifting has been considerably reduced to cut car cleanup and ease housekeeping labor.

Manpower efficiency has been improved 40%. Each bag is stacked individually in the car or truck so that resulting load is uniform and compact. Shifting during transit is minimized, meaning fewer damage claims. Stacking is made with less lifting. All hand trucking is eliminated.

(Model "A" Bagpaker is a product of International Paper Co., Bagpak Div., 220 E. 42nd St., New York 17, N.Y.)

Check 1754 opposite last page.

(Power-curve conveyor and bag flattener are supplied by Power-Curve Conveyor Co., 2185 S. Jason St., Denver 23, Colorado.)

Check 1755 opposite last page.

Zinc industry activities for 1958 are reviewed in 16-page booklet which summarizes production and consumption picture as of December 31. Detailed tables cover mine production, slab and ore imports, slab zinc production according to grade, slab zinc consumption by major markets and in principal Free World nations. How the recession affected the industry and its major markets is described.

Fourth-quarter recovery trends are discussed, and market expansion factors are indicated. A report is given on a new world-wide zinc and lead industry research program initiated in 1958. Copies of "A Review of the Zinc Industry in the United States During 1958" may be obtained from American Zinc Institute, Inc., 60 East 42nd St., New York 17, N.Y.

Check 1756 opposite last page.

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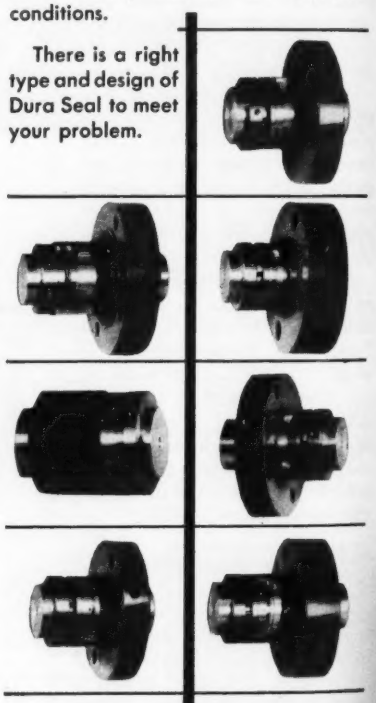

For further details, write for free copy of Catalog No. 480 CP

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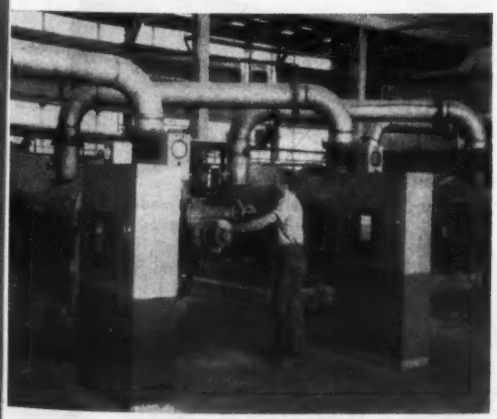
Check 1757 opposite last page

Efficient planning plus high-horsepower refining equipment at Pine Bluff, Arkansas, mill of International Paper Company, results in . . .

500 TONS FOODBOARD PER DAY FROM 300-INCH PAPER MACHINE

PRODUCTION of nearly 500 tons/day of foodboard from a single 300" Beloit paper machine is anticipated at International Paper Company's recently completed mill at Pine Bluff, Arkansas. A carefully planned system implemented by high-horsepower refining equipment, accounts for the high tonnage output. Layout for the big installation includes power plant, the paper mill itself, pulp mill, woodyard, laboratory, and complete finishing and shipping facilities.

The mill is located on a 4000-acre tract of land just outside the city limits. The foodboard produced is in the form of bottlestock. Two grades are turned out: 16 point light stock (215 lb) for quarts, pints, and half-pints; and 22 point heavy stock (285 lb) for half gallons. The mill also produces newsprint.



Finger-tip adjustment on giant jordans assures uniform stock treatment

Process Flow

Leaving the bleach plant, stock is first pumped through four, continuous refiners operating in parallel. Each machine handles about 150 tons per day. Stock is then delivered to 1800-cu ft capacity mixing tub. Stock and material returning from broke storage tower are continuously mixed in this unit and transferred to 7-ton capacity, tile-constructed, retention tank.

Upon demand, stock is sent to 30-ton machine tower. Final refining is done in group of five jordans, operating in series. Entrained air is removed by a Deculator as stock moves through jordans to air-cushioned head box of paper machine.

Actually, there are two 300" Beloit paper machines in the mill — one for producing foodboard, the other for newsprint. Both of the machines are served by automatic repulpers. Broke falling from paper machines is carried by belt conveyor to stainless-steel repulping tanks beneath dry end of machines. Additional broke from trimming and finishing operations is delivered manually to tanks.

Refiners Save Floor Space

The five big jordans used in the final refining operation provide extreme flexibility with precise control. Piping for the units is simple and only a few motors are needed. Compactness of the layout resulted in considerable floor savings. Machines have 700-hp rating, are ruggedly constructed, and require only minimum maintenance. Roller bearings are installed in mountings specially designed to relieve heavy loads demanded on the jordans.

The four refiners performing the initial refining are also space savers. Of the double-disc type, each unit can do the work of two conventional machines. The refiners are driven by 600-hp motors. Each unit has two refining stages — consisting of a rotating disc between two stationary discs. Refining action can be varied by using one set of discs on inlet side and a different design on outlet side.

Defiberization is accomplished between first-stage discs. This permits more thorough refining to occur in second stage. Each refiner is automatically controlled by amount of amps pulled by its motor.

Automatic Repulpers

Repulpers serving paper machines are fitted with double-suction pump system and completely automatic level and consistency controls. Smaller, 600 gpm pump maintains pulp consistency by means of water regulation. Larger 2500 gpm pump auto-

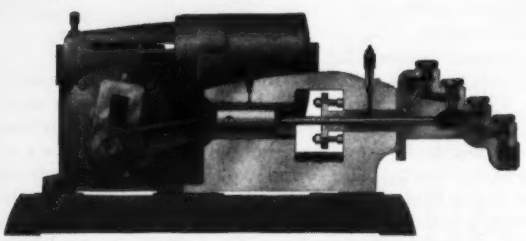
Five 700-hp jordans (left) and four 600-hp refiners (right) serve big 300" Beloit paper machine (rear)

HOW TO METER SLURRIES ACCURATELY

Few pumping jobs present more complex problems than the accurate metering of slurries. Since they are often abrasive, slurries can make the selection of pump parts extremely difficult. Minute particles settling out in the packing can score a plunger beyond usefulness in minutes. And viscous, tacky slurries can limit ball check freedom and reduce accuracy. But even the toughest slurries *can* be metered accurately . . . by adhering to good slurry handling practice, and by choosing the right pump for the job.

Keep Slurries In Suspension

Several practices that have proved valuable in this difficult service are aimed at keeping the solids in suspension. Suction and discharge lines should be as short as possible. The supply tank should always be well agitated. And if packed plunger pumps are used, stroking speed should be held between 45 and 75 rpm to minimize settling.



Standard Motor Driven Controlled Volume Pump

Choosing The Right Pump

Controlled volume pumps are manufactured in a sufficient variety of designs to provide a full range of desired characteristics for slurry service. An economy pump such as Milton Roy's H20® can handle slurries up to 5% by weight. Standard motor driven pumps, with minor modification, can handle much denser slurries. And the new ODS (Oliver Diaphragm Slurry*) controlled volume pump can easily manage slurries containing up to 60% solids by weight.

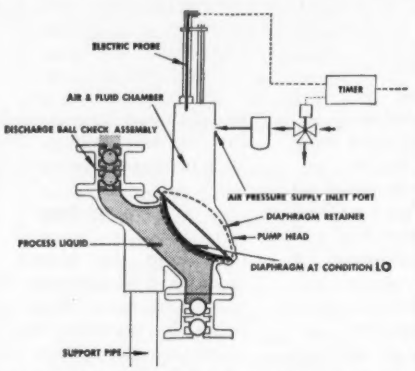
*Manufactured under exclusive license granted by Dorr-Oliver Inc.

Packed Plunger Pumps

Because the entire liquid end of a packed plunger pump is in intimate contact with the slurry, considerable attention must be paid to materials selection. Ball checks and plunger should be as hard as possible, and seats should be relatively soft. Balls are usually made of Hastelloy D, 440 stainless, or ceramic, while 316 stainless is standard for the seats. The plunger must be extremely hard, and high strength sintered alumina is generally recommended.

Proper packing maintenance in slurry service demands that packing be flushed out continuously. An internal flush, continuously bleeding a small amount of liquid along the plunger, is the most common. Dangerous liquids may require an external flush arrangement. Liquid is continuously fed in on one side of the lantern ring, drawn around the plunger, and carried away from the other side.

The ODS Controlled Volume Pump



Capable of pumping 180 gph of the densest slurries at accuracies of ± 2% against pressures up to 90 psi, the ODS has no plunger, no packing. It is based on the Oliver Diaphragm Slurry pump design principle which consists of two opposed chambers separated by a slack diaphragm. A three-way solenoid alternately pressurizes and bleeds air from the upper chamber. With the upper chamber at atmospheric pressure, the suction head forces slurry into the lower chamber. Then, when the upper chamber is pressurized, the diaphragm forces the slurry out through the specially designed ball check valves.

Problem Slurries

Yes, slurries *can* be metered accurately. And the best proof of this claim is the thousand or more Milton Roy pumps successfully metering slurries in the field. The list includes such problem liquids as an 80% coal slurry, a 45% suspension of lead peroxide in butyl phthalate, 15 to 20% diatomaceous earth slurries, finely divided nickel catalytic suspensions, gold ore slurries, and even a 55% by weight powdered aluminum suspension. Some of these materials are so thick that they can support the weight of a screwdriver.

If precision metering of slurries is one of your problems, look again to Milton Roy's 25 years of experience for your most economical solutions. Write for a general introduction to controlled volume pumping given in Catalog 553-1, Milton Roy Company, 1300 East Mermaid Lane, Phila. 18, Pa.

Controlled Volume Pumps • Quantichem Analyzers • Chemical Feed Systems

milton Roy
CHEMICAL INSTRUMENTATION SYSTEMS

Check 1758 opposite last page

IDEAS

matically draws off pulp above certain level for reprocessing.

Five level-control points are in each repulping tank. Lowest is point below which both pumps shut off, a shower water valve opens above tank and and an alarm is sounded. If levels rises after time delay, pumps start again.

Next control point causes 3-way valve to open for recirculation when level of pulp in tank is decreasing. Third point opens this valve when level is rising. This also starts second pump which draws pulp off through extractor.

Fourth point in tank opens an auto-throttling valve. At fifth and final point, a purge contact is reached which closes shower water valve.

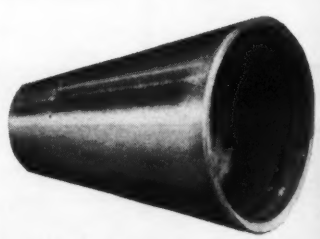
(Double disc refiners, Leviathan jordans, and Brokemaster automatic repulpers used in mill where manufactured by E. D. Jones Corp., Pittsfield, Massachusetts.)

Check 1759 opposite last page.

Tungsten-fabrication field is greatly expanded by new techniques

Shear-spinning of tungsten may aid space ventures

Recent developments in tungsten fabrication have opened up new vistas for application of the metal. These developments may permit use of tungsten to obtain greater



Conical section is made from rolled tungsten sheet by shear-spinning. This type of fabrication could be used in conventional nose-cone design

reliability and longer life in electronic tubes and controls, reduction in component sizes, processing of materials at higher temperatures, components and assemblies with

adequate strength at extremely high operating temperatures (particularly in space applications), and construction of research equipment for exploration of new high-temperature phenomena. Tungsten has a melting point of 6152°F.

Until recently, fabrication of tungsten, in other than relatively simple shapes, was not possible. Also, ratio of cost to economical performance provided no incentive to develop new manufacturing techniques. Now, emphasis is being placed on performance rather than cost.

The most dramatic development has been fabrication of rolled tungsten plate or sheet by spinning. Major potential application in this instance is in field of rocket nozzles and possibly in other components such as re-entry nose cones.

Other recently developed tungsten-fabrication techniques show real promise. Tungsten forgings can be made in a series of steps or sequences, taking advantage of increased ductility as it is subjected to further working. This technique may be used for simple rivet, X-ray-tube target, rocket-nozzle throat, electronic-tube components.

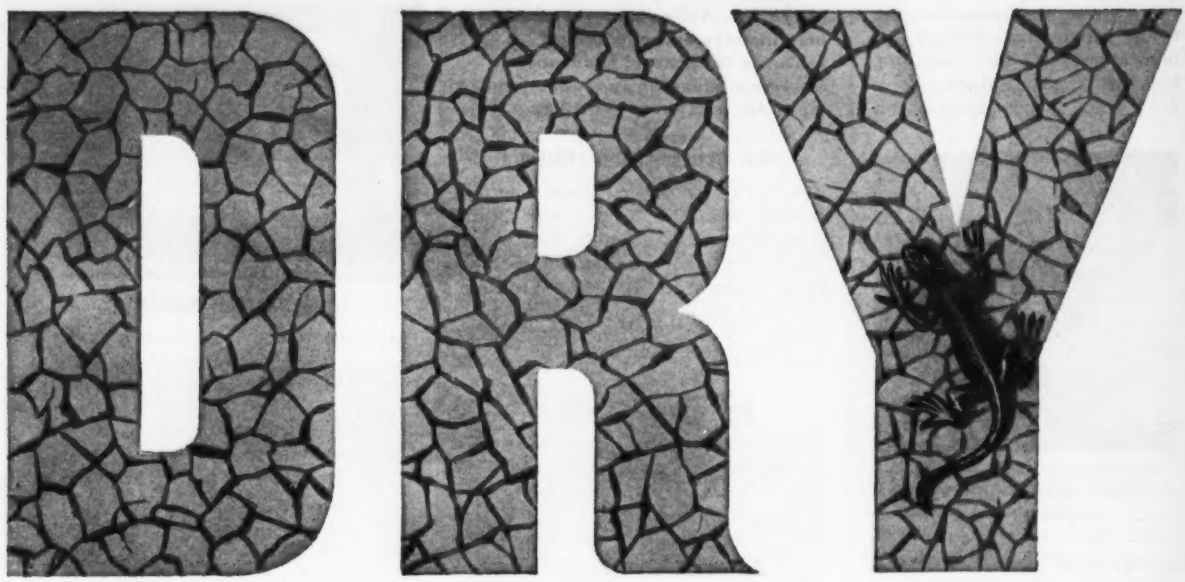
Seamless tungsten tube is now produced by hot extrusion. Extruded tube might be used for drawing thinner-walled tube or be hot-upset to make special shapes. Also, it might be cut into slices for electronic contacts in small gyroscope rotors or electronic-tube components.

Recently developed deep-drawing techniques of tungsten fabrication open up possibility of designing continuous metal evaporating equipment. Deep drawing and machining can extend use of pure tungsten for gyroscope rotors. This would result in size decrease of gyro controls without corresponding loss in operational integrity.

(Further information concerning recent developments in tungsten-fabrication techniques may be obtained from Fansteel Metallurgical Corporation, North Chicago, Ill.)

Check 1760 opposite last page.

If it must stay



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One cubic inch of Davison Silica Gel has an adsorptive surface of 90,000 square feet—an area larger than two city blocks. This capacity has made Davison Silica Gel the favored desiccants for air and gas dehydration wherever rust, corrosion, mildew or other moisture problems exist. For instance, Davison desiccants are used to protect tropical shipments, to clean and dehydrate air and natural gas—refrigeration systems—blast furnace gases—and in oxygen plants. Perhaps the application of a Davison desiccant to *your* moisture problems is in order. Write Dept. 3725 or call today for complete information.

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BALTIMORE 3, MARYLAND

Check 1761 opposite last page

Synthetic-quartz process moved out of lab into pilot plant

Hydrothermal processing is scaled up

Details of pilot plant which utilizes hydrothermal process to produce synthetic quartz crystals were recently presented in a paper before the American Institute of Chemical Engineers.

Hydrothermal process has been widely investigated on laboratory scale for some time. Quartz crystals about ¾ x 1½" and larger have been

Hydrothermal process is used to produce synthetic-quartz crystals on pilot-plant scale

grown in a laboratory. Processing equipment has now been scaled up for pilot-plant investigation.

Quartz crystals up to two to three inches in each cross-section dimension and five to seven inches long have been grown with this equipment. Optimization of processing parameters, not crystal largeness, has been goal.

In hydrothermal process, long narrow autoclave, mounted vertically, is filled with alkaline solution, usually sodium hydroxide. Small pieces of natural quartz are then placed in bottom of vessel to provide nutrient.

Seed plates cut from natural quartz or synthetic crystals are hung from rack in upper section of vessel. After sealing, autoclave is heated to required temperature.

Autoclave is maintained under constant temperature differential, from bottom to top, for required processing time. This period varies from one

BRISTOL'S INSTRUMENTATION

★ *News and information about automatic controlling,*

Instrument measures, controls any process variable that can be transduced to an electrical quantity

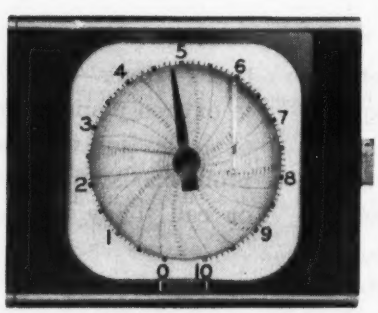
Bristol Electronic Dynamaster* potentiometer and bridge instruments embody design features for utmost accuracy. Many models, many accessories made for extreme versatility

"Over design" insures reliability

The Dynamaster's simple design with few moving parts, plus "over design" in all components insures long life. Easy to use and service, the instrument requires little or no maintenance. Rugged construction . . . ideal for industrial plants, and pilot plants . . . gives the Dynamaster exceptional vibration resistant qualities.

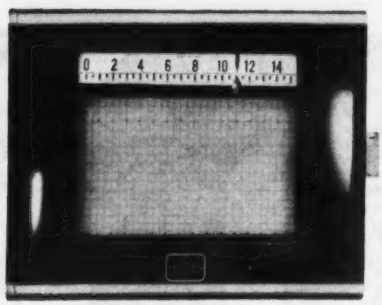
High instrument accuracy

Conservatively rated components, Bristol's careful design and manufacture, combined with the proved Dynamaster motor-driven null-balance principle insure high instrument accuracy and precision in fast electronic measurement and control. Used in miniature as well as full-sized Dynamasters, the motor-driven null-balance design not only provides high accuracy, but also affords plenty of torque for operating alarm contacts, analog to digital converters and other control devices.



Eliminates dry cells

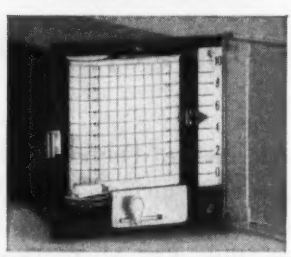
"No-Batt" continuous standardization, available as an optional feature, accurately and automatically standardizes the potentiometer against standard cell continuously, without interruption to service. Dry cells and the usual standardizing mechanism are eliminated. **T.M. Reg. U.S. Pat. Off.*



Wide range of models

Dynamaster round chart instruments are available in one- or two-pen models. Strip chart models are available as single-pen, two-pen or multiple-record instruments up to 24 points. Dynamaster models for research and testing include: High speed (0.4 sec) Recorders; Two-Pen Recorders; X-Y Recorders (function plotters); Extended Range Recorders; Adjustable Span and Zero Recorders.

Electronic Dynamaster Pneumatic Transmitter



The Dynamaster is now available as a recording or indicating pneumatic transmitter. This new miniature instrument is offered as a potentiometer, pyrometer, d-c bridge, or a-c bridge for making such measurements as resistance, conductivity, strain, and many others, or it can be a differential-transformer receiver. It continuously transmits a 3-15 psig air pressure signal which can be used to operate recording and controlling pneumatic instruments, such as Bristol Metagraphic Instruments. Full size Dynamaster air control instruments are, of course, also available.

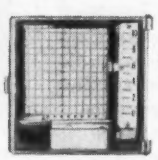
Many electric and pneumatic controllers

Dynamaster round- and strip-chart instruments are available with a wide variety of controllers, both electric and pneumatic.

Electric controllers include on-off, proportional input, 3-position, proportioning, proportional with automatic reset and time program models.

Pneumatic control models include on-off, proportional, proportional with reset and proportional with reset and derivative types in addition to the Dynamaster Pneumatic Transmitter described above.

Dynamaster recorders can be equipped with analog to digital encoders or converters of various types for readout or computer use. This feature extends the already wide range of applications for which Dynamaster instruments are suited.



"Plug-in" miniatures

Bristol miniature Dynamasters (Series 663) take only 5" x 5⅛" panel space. A true plug-in chassis permits 10-second changeover from an indicator to recorder, lets you plug in spare instruments with minimum interruption to control. Miniatures utilize the same highly accurate, motor-driven null-balance principle as full sized Dynamasters which assures ample torque for operating auxiliary equipment or contacts—another advantage over ordinary galvanometer type instruments.

Dynamaster records stomach acidity

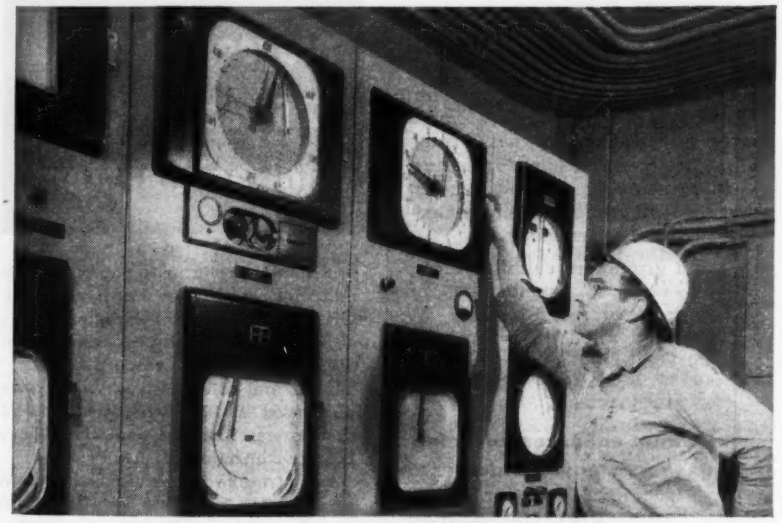
Here's a novel Dynamaster application in medical research. Dr. Joseph Gambescia, at Hahnemann Medical College and Hospital, uses a Bristol Recording Potentiometer to study effects of various alkalinizing agents on stomach acidity. The transducer that feeds the Dynamaster is a specially developed glass electrode which is swallowed by the subject.

NEWS AND NOTES

recording and telemetering instruments from Bristol ★

The now-famous Shippingport, Pa., Atomic Power Station is the United States' first full-scale central station nuclear power plant devoted exclusively to civilian use. Westinghouse Electric Corporation designed and developed the nuclear portion of Shippingport under the direction of and in technical cooperation with the Naval Reactors Branch, U. S. Atomic Enerrgy Commission.

The Bristol Company is one of the intrument suppliers furnishing electronic potentiometer and bridge instruments used here.



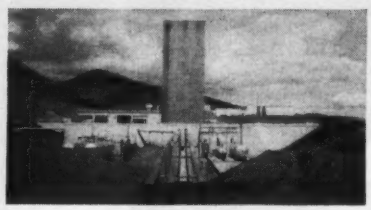
Complete temperature profiles increase yield at LCA

Control of time-temperature relationships in decrepitation of lithium ore is critical. Too high temperatures in the huge 250' rotating kiln at the Lithium Corporation of America, Bessemer City, N. C., plant could cause clinker rings and reduce yield. If temperatures are too low the desired chemical conversion will not take place. The problem was how to continually measure internal temperatures throughout the entire length of the kiln. Bristol instrumentation was the answer.

Instruments provide complete temperature profiles within the initial kiln and monitor every step of the process to the final continuous crystallizer. Operators above spot checks temperatures at Bristol panel board. 8.47

BRISTOL TRAIL-BLAZERS IN PROCESS AUTOMATION
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

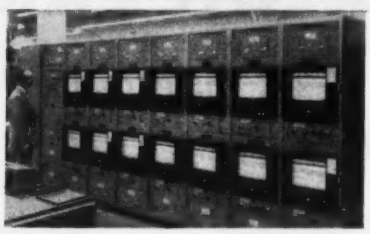
Check 1762 opposite last page



Testing the Titan

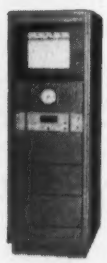
A panel of Bristol electronic instruments at Martin-Denver Division's Propulsion Laboratory above aids propulsion tests of the Titan ICBM, largest of the Air Force missiles. These Dynamaster recorders were installed as part of the test equipment supplied by Pomona Division, Marquardt Aircraft Co., formerly Associated Missile Products Co. They are used to check out kill parameters during tests. Monitoring engineers can stop tests if the red line limits on critical readings are exceeded.

Record wind tunnel data



Fourteen strip chart Dynamaster millivoltmeters record aerodynamic data from variable resistance strain gages on models under test in the Boeing supersonic wind tunnel. Each recorder is equipped with analog-to-digital converters which convert the Dynamaster potentiometer shaft rotation to digital output. The complete hookup makes possible immediate presentation of computed data simultaneously with the running of the test.

New Dynamaster fits standard 19″ relay rack



Many Dynamaster models now fit into standard 19″ relay racks without modification to rack or instrument. These are the first such instruments that may be so installed without cutting or masking. For more facts, write: The Bristol Company, 141 Bristol Road, Waterbury 20, Conn.

to several weeks depending on nature of experiment being performed.

(Synthetic-quartz production studies are being carried out jointly by Bell Telephone Laboratories, Inc., 463 West St., New York 14, N.Y., and Western Electric Company, Inc., 195 Broadway, New York 7, New York.)

Huge expansion program started by paper mill

Total cost of project will run about $15 million

Softwood kraft mill with capacity of 175 tons of pulp per day is being built by Oxford Paper Company, Rumford, Maine. The new mill is part of the firm's $15 million expansion program. Also included will be a chlorine dioxide bleaching system for short and long fiber pulp, a 300-ton per day chemical recovery plant, and an addition to the existing hardwood kraft mill.

Hardwood mill production is expected to be boosted from 250 to 350 tons per day. This, together with the improved quality pulp from the softwood kraft mill, should permit company to use more completely and economically the wood species available in the surrounding area.

The firm also plans to shut down its two existing sulfite mills. This will eliminate major source of river contamination from pulp and paper operations in the Rumford area.

(Design and construction contract for major portion of expansion program has been awarded to Rust Engineering Company, 930 Fort Duquesne Boulevard, Pittsburgh 22, Pennsylvania.)

Oil for atomic shielding windows which resists clouding and discoloration is described in bulletin. Complete specifications for two oils are included. Bul 101—S. Sonneborn Sons, Inc. 300 Fourth Ave., New York 10, N. Y.

Check 1763 opposite last page.

THIS

direct drive

BIFURCATOR® FAN

installed in duct makes fume removal an inside job

Installed directly in ductwork, space-saving DeBothezat Bifurcator Fans provide efficient direct drive power for fume removal.

Damaging fumes are kept away from the motor by a housing of acid-resistant metal alloy or of steel protectively coated with PVC (plasticized polyvinyl chloride) and many other types of synthetic linings. Fan wheels can also be made with similar anti-corrosion protection.

Save Installation Dollars

Installing a DeBothezat Bifurcator Fan is about as quick and simple as putting in a section of ductwork. Direct drive eliminates recurring maintenance problems. From space-saving installation to long-term operating economy, DeBothezat Bifurcator Fans keep costs down all the way. Contact a DeBothezat representative for further details or see our section in Sweet's Plant Engineering File.

De Bothezat™ FANS

A DIVISION OF

American Machine and Metals, Inc.

EAST MOLINE, ILLINOIS

FOR FURTHER INFORMATION SWEET'S PLANT ENGINEERING FILE OR WRITE FOR COPY

Check 1764 opposite last page

Underground storage tanks quickly quench thirst of jet transports

Jet transports can now be refueled quickly from underground storage tanks. Recent demonstration of ground pressure-refueling system included procedures for varying conditions such as automatic and emergency shut-off and high-speed fuel transfer.

Handling of jet fuel requirements (quantities ranging up to 22,000 gal) by conventional tank-vehicles may be too slow and cumbersome. An average jet transport carries four to five times more fuel than piston-engine craft.

With proposed system, fuel is pumped from underground tanks of up to 1,000,000-gal capacity. Fuel is passed through hose from recessed ground hydrant to filter separator on vehicle where water is removed. From vehicle, hoses run into plane.

Smaller air-pressure hose between hydrant and vehicle is control source for fuel pressure and provides means for emergency shut-down. Third hose contains fuel and is means for sensing distance pressure between hydrant and vehicle. Dead-man lever precludes excessive fuel runover.

(Jet ground-refueling hydrant system is development of Parker Aircraft Co., 5827 W. Century Blvd., Los Angeles 45, Calif.)

Oxime enhances atropine as nerve-gas antidote

Reactivates cholinesterase supply in body

Atropine, used in conjunction with new oxime, TMB-4, has proved to be effective nerve-gas antidote in recent tests, according to a report recently made to the American Chemical Society.

Nerve gases and related phosphorus-containing insecticides combine with and inactivate a vital enzyme or body chemical called cholinesterase. This is found in brain and is needed to prevent excessive accumulation

Aloyco Valves on 26-year duty in hot acid system

Still going strong in the sulphite pulp mill of Eastern Fine Paper and Pulp Division, Standard Packaging Corp., at South Brewer, Maine, is the Aloyco Stainless Steel "Y" valve, above.

This, and other Aloyco Valves were purchased in 1933 when the hot acid system was installed here. They have been in continuous use ever since.

Long trouble free service is the reason so many U. S. plants are turning to stainless steel and high alloy valves... even for mild corrosive service.

Only one company has specialized in corrosion-resistant valves exclusively for 30 years: Alloy Steel Products Co. Call us in on your next valve job. Write us at 1302 West Elizabeth Ave. 9.7

Longer Lasting ALOYCO VALVES

ALLOY STEEL PRODUCTS COMPANY

Linden, New Jersey

Check 1765 opposite last page

MULTIPLE BATCH GRINDING WITH VERSATILE

abbé

JAR ROLLING MACHINES

Style M, Two-Tier machine, with two rollers per tier, mounted on built-in storage cabinet.

Multiple batches of similar or different materials can be economically ground, pulverized or mixed simultaneously on a versatile Abbé Jar Rolling Machine.

Jars, bottles or containers of different sizes can be used at one time. Each jar can be removed after its full grinding or mixing cycle has been completed—without stopping the machine.

Modern, rugged Abbé Jar Rolling Machines are available to handle single or parallel rows of jars, and in double or triple tiers for processing as many jars as required. Standard porcelain or steel jars range in size from 1 quart to 6 gallons. Built-in storage cabinets on tiered machines are optional.

Write for NEW Abbé Jar Rolling Machine Catalog 79

Address Dept. 46

abbe ENGINEERING CO.
620E GRAYBAR BLDG., NEW YORK 17, N. Y.
Designers and Manufacturers of
Ball, Pebble and Jar Mills • Pulverizers
Sifters • Cutters • Mixers

Check 1766 opposite last page

of acetylcholine. Latter is hormone which transmits nerve impulses.

When cholinesterase is inactivated by nerve gas, acetylcholine builds up in nerve tissues. This causes paralysis of nerves which control breathing mechanism.

Atropine acts only to halt effects of excess acetylcholine. TMB-4 has been effective in reactivating cholinesterase.

(Nerve-gas antidote studies are being carried on by Chemical Warfare Laboratories, Army Chemical Center, Edgewood, Md.)

Radioisotopes' mixing techniques are discussed in 4-page bulletin. Uses, examples and advantages of the methods are included. Tech bul 2—Nuclear-Chicago Corp., 229 West Erie St., Chicago 10, Ill.

Check 1767 opposite last page.

Small-scale ammonia plant

. . . produces 30 tons/day of ammonia for Apache Powder Company's explosives and chemicals works at Curtiss, Arizona. It is said to be smallest completely integrated ammonia plant in country.

Facility operates at direct-production costs competitive with more conventional installations of 100-ton capacity or more.

Plant went on stream in May 1958. It uses conventional hydrocarbon-reforming operations, producing ammonia-synthesis gas from natural gas.

(Ammonia plant was put up by Girdler Construction Division of Chemetron Corporation, 222 East Broadway, Louisville 1, Kentucky.)

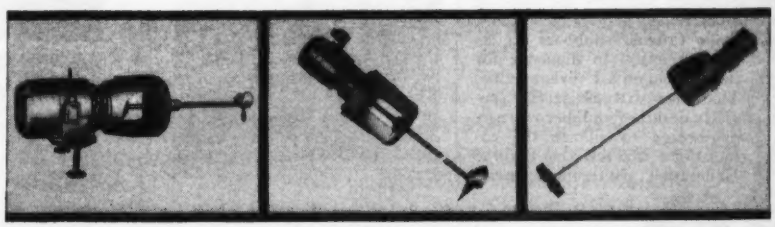
EASTERN MIXERS

mix fluids quickly . . . thoroughly

EASTERN'S COMPLETE LINE of fluid mixers range from fixed-mounted 40 H.P. turbines and heavy-duty propeller mixers to lightweight portables. Where fixed-mounted installations are not required, Eastern Portables offer versatility, ease of handling and long-term cost savings.

Portables are available with speeds of 420, 1125 and 1725 R.P.M., rated from 1/20 to 3 H.P. as standard, with variable speed and air-driven models also available. Motors in all standard types can be supplied in open drip-proof, totally-enclosed, or explosion-proof construction. Shafts and single or dual propellers are available in a choice of alloys for all service requirements. New optional ball-swivel clamp as illustrated, permits easy adjustment of mixer position in tank.

For a personalized analysis of your mixing problems, send details to Eastern engineers. A recommended solution will be furnished promptly and without obligation. For a helpful guide to mixing fundamentals, write for "Handbook of Fluid Mixing."



SIDE-ENTERING MIXERS
Handle the extra heavy-duty jobs in big tanks. Sizes ¼ to 30 H.P. Send for Bulletin 620.

TOP ENTERING MIXERS
Designed for heavy-duty applications requiring agitators from ¼ to 10 H.P. Send for Bulletin 620.

TURBINE MIXERS
Range of ¼ to 40 H.P. solve many special mixing problems. Send for Bulletin 1210.

NEW PORTABLE MIXER BULLETIN

Eastern's improved line is included in the revised Bulletin No. 530.

Eastern INDUSTRIES, INC.
Dept. A-4, Norwalk, Conn.

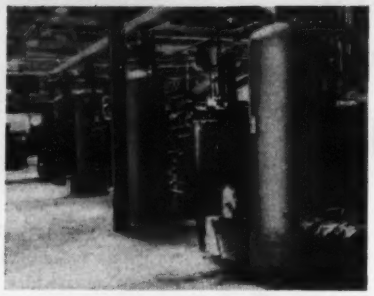
Check 1768 opposite last page

BURGESS-MANNING

SNUBBER NEWS

Dedicated to the Elimination of Pulsation and Intake and Exhaust Noise

Fifteen Year Pulsation Problem Ended!



Burgess-Manning Pulsation Snubbers, installed in the discharge laterals, effectively eliminate a costly 15 year old pulsation problem.

The four horizontal gas engine driven air compressors at the plant of a glass company presented a puzzling and costly pulsation problem from the time they were first put in operation. Numerous pipe line breaks occurred due to mechanical fatigue caused by gas pulsation. Bracing, the installation of expansion joints and other remedial measures tried from time to time proved ineffective.

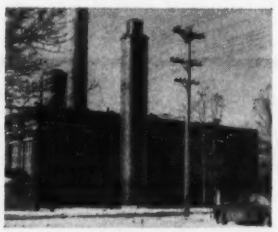
Finally, after years of unsuccessful efforts to correct this violent pulsation condition at a substantial cost, Burgess-Manning engineers were called into consultation. The condition required the design and construction by Burgess-Manning of special snubbers that were installed in the 45 psig pressure discharge laterals adjacent to each compressor.

As a result, for the first time in 15 years, pulsation in the air lines was reduced to a satisfactory level, and the costly and damaging vibration in the discharge headers and after-coolers was completely eliminated.

The Burgess-Manning Company, through its long experience in this field, is equipped to analyze such problems and engineer an effective solution.

Burgess-Manning Snubbers Vary Greatly in Size

Depending upon the particular job to be accomplished, Burgess-Manning Snubbers are built in an extremely wide range of sizes. Some exhaust snubbers are as small as 4½" in diameter for installation on a 1" exhaust line. The other extreme is the specially designed snubber recently engineered to silence the exhaust of a 5000 KW Gas Turbine Generating Unit, which measures 74 ft. in length and 12 ft. in diameter and is believed to be the world's largest.



This is a cross-section of a snubber typical of many styles designed and built by Burgess-Manning to eliminate pulsation in gas and air pipe line systems or exhaust noise from internal combustion engines, blowers, turbines, compressors, etc.

SEND US a brief outline of your pulsation or exhaust noise problems and we will gladly send you pertinent literature.

BURGESS-MANNING COMPANY

Sound Engineering *Industrial Silencer Division*

9231 Sovereign Row, Dallas, Texas
Libertyville, Illinois

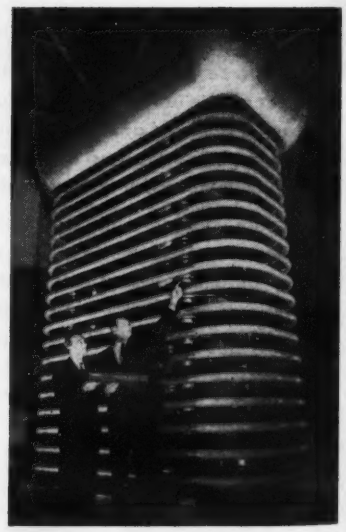
Check 1769 opposite last page

Radiation lab with king-size "hot room"

Geared to conduct wide variety of nuclear studies, GE's new $1.5 million can test machinery up to size of a telephone booth

How machinery and equipment stands up under moderate or low doses of radiation over long periods of time is one of the things that General Electric Company hopes to find out more about at its new radiation test facilities in Schenectady, New York. Built at cost of some $1.5 million, and financed entirely by the company, the installation plans to undertake a wide variety of studies to determine

◀ Radioactive cobalt source is maneuvered into place at bottom of 24' well in radiation room



▲ One-million-volt atom smasher installed at lab can provide beam current of 10 milliamperes

◀ Radiation chamber measures 22x12x10'. Small objects may be placed into aluminum baskets for close-up irradiation by gamma source located in well below floor. Source can be raised for exposure to large equipment brought into room

effects of nuclear energy upon man's physical environment.

The installation boasts one of the largest "hot rooms" in existence. Measuring 22x12x 10′, it permits equipment up to the size of a telephone booth to be bombarded with radiation. A 10,000-curie cobalt-60 source is located at bottom of a 24′ well below floor of the room. The source is contained in a metal basket beneath 16′ of water.

Controls outside room permit source to be drawn to top of well for radiation tests. In other words, rather than bring object to be tested down to the source, the source can be brought up to the object.

Nuclear bombardments up to 500,000 roentgens per hour are possible. Instruments keep constant check on what is happening. Visual observation is possible through a water-filled window and by means of closed-circuit television. Gamma rays from the radioactive source can be trained upon the objects for months or even years, if necessary.

The cobalt-60 is contained in stainless-steel plates, 14″ long x 2″ wide x 3/16″ thick. Up to 20 of these plates may be placed around periphery of basket.

Accelerators Too

The new facilities also include a one-million-volt electron accelerator and a one-million-volt ion accelerator. Designed and built by GE, both of the units use a Cockroft-Walton power supply. The machines can give a DC beam current of 10 milliamperes at one mev.

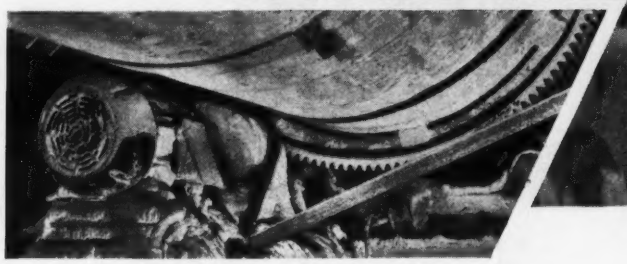
Primary feature of the electron accelerator is its high beam current and therefore its high dose rates — about 10^{11} roentgens per hour a few inches from the window. Much of the work of this machine will be irradiating plastics or other organic materials, either for improving them with radiation or for radiation damage studies. The high dose rate of the unit makes it possible to run radiation damage studies in relatively short times.

To next page

Foote Bros. Drives in the CHEMICAL PROCESS INDUSTRY

Puts 60 Tons of Plant Food Through the Wringer Every Hour —

NEVER MISSES A TURN!



Driving a giant concurrent dryer, 50 feet long and 7 feet in diameter, with a capacity of 60 tons of plant food per hour takes a reducer with plenty of stamina.

Add the fact that the reducer must withstand heavy shock loads and continuous 24-hour-a-day operation during peak production periods, and you've got a problem.

Yet—the Foote Bros. LINE-O-POWER Reducer used to rotate this unit was installed more than two years ago and has never been shut down for maintenance.

Dependable, trouble-free performance of Foote Bros. Drives in the chemical process industry is no accident. One of many things you can count on when you specify or install a Foote Bros. Drive is rugged, stand-up-and-take-it stamina. We build them that way.

There's a Foote Bros. unit available to meet your drive requirements. Ask your nearby Authorized Foote Bros. Distributor to recommend the right unit for your requirements. Write for LINE-O-POWER Engineering Manual LP-3.

100 YEARS SERVING INDUSTRY 1859-1959

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION • 4555 SOUTH WESTERN BOULEVARD • CHICAGO 9, ILLINOIS

Check 1770 opposite last page

From preceding page

Greatest use for the ion accelerator will probably be as a high-energy neutron source. It is well suited for basic research studies where reasonably mono-energetic neutrons are needed and high total doses are not. The low residual radioactivity permits easy post-irradiation examination of samples.

The machine produces neutrons by bombarding a beryllium target with one mev deutrons. This yields a neutron intensity of about 10^{11} fast neutrons/cm² sec near the target. Neutrons cover spectrum of energies ranging from about one to five mev.

The new facilities are housed on a former 46'-diam overspeed test pit for generator rotors. Because of hazards associated with high speed testing of large rotating machinery, former facility was made up of a considerable mass of re-enforced concrete and the very substantial footing required for it.

Original test pit was practically covered over with an 8'-thick concrete cap. The gamma irradiation room, the electron accelerator and irradiation room, the ion accelerator, and the machine control room are all located on top of this cap.

Walls of test pit were composed of a 3'-thick concrete well, followed by seven feet of sand and dirt, in-turn followed by four more feet of concrete. The seven-foot wide annular space was excavated and enlarged to provide a maze and irradiation room for ion accelerator. Test pit itself is used for general experimental area. It took about five years to complete the project.

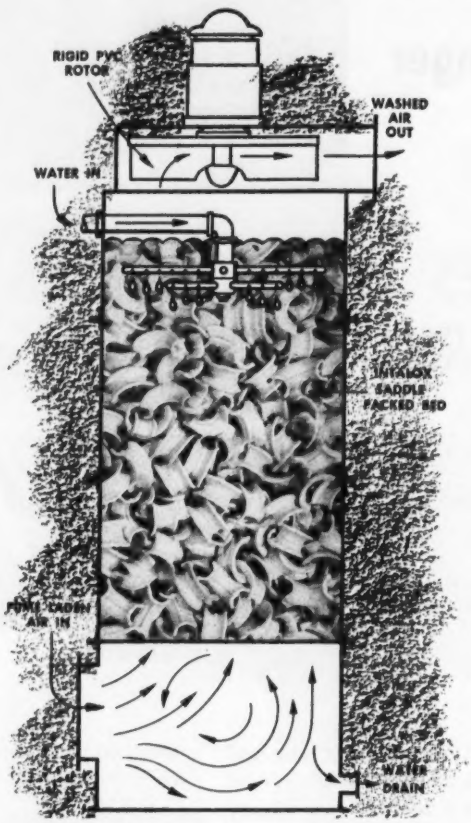
(Further information about radiation facilities can be obtained by writing to General Electric Company, Schenectady 5, New York.)

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

FOUR WAYS TO HANDLE F

Absorption of noxious fumes by wet bed scrubbers is generally accepted as the most satisfactory method where virtually complete fume removal is required. With the development of packings of high efficiency, such as Intalox Saddle Packing and Metal Pall Rings and improved liquid distribution methods, fume scrubbers of high capacity yet occupying little space and operating at low cost have become practical.

On these two pages are illustrated and briefly described both standard and custom-built fume scrubbing units of our manufacture. Full engineering data is available on request. U. S. Stoneware's Engineering Department will be glad to work with you in designing fume removal systems to meet your specific needs.



"CYCLONAIRE" Fume Washer

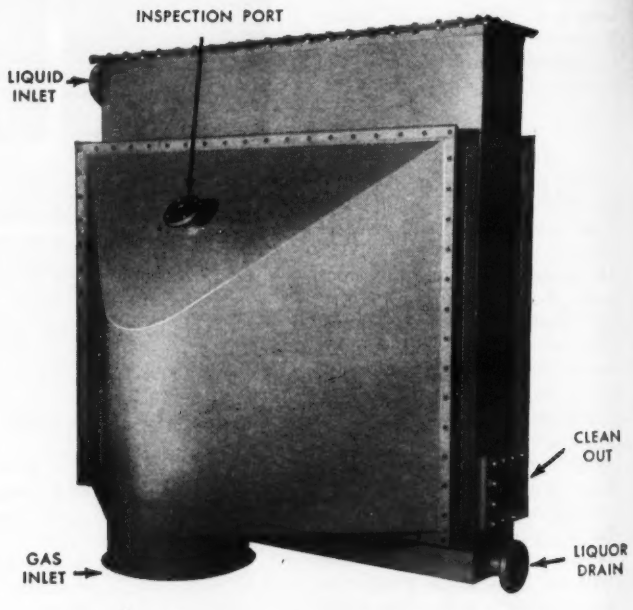
Designed primarily to handle relatively mild fume problems in laboratories, special departments, etc., the Cyclonaire is made in four sizes with rated capacities of 750, 1650, 3500 and 6000 cfm. It will effectively remove up to 99% of fumes (where the concentration of gases is 1% or less). The Cyclonaire comes complete with blower, motor drive unit, and Intalox Saddle Packing. The unit is constructed of 12 gauge steel, lined with 3/32" thick Tygon sheet plastic. The rotor is rigid polyvinyl chloride plastic. All exterior surfaces are protected with Tygon Paint.

The "Cyclonaire" can be equipped with mist or dust eliminators or provided with recirculating pumps. Two units can be arranged in parallel to handle additional cfm, or in series for heavier fume concentrations.

The "CROSS-FLOW" Fume Scrubber

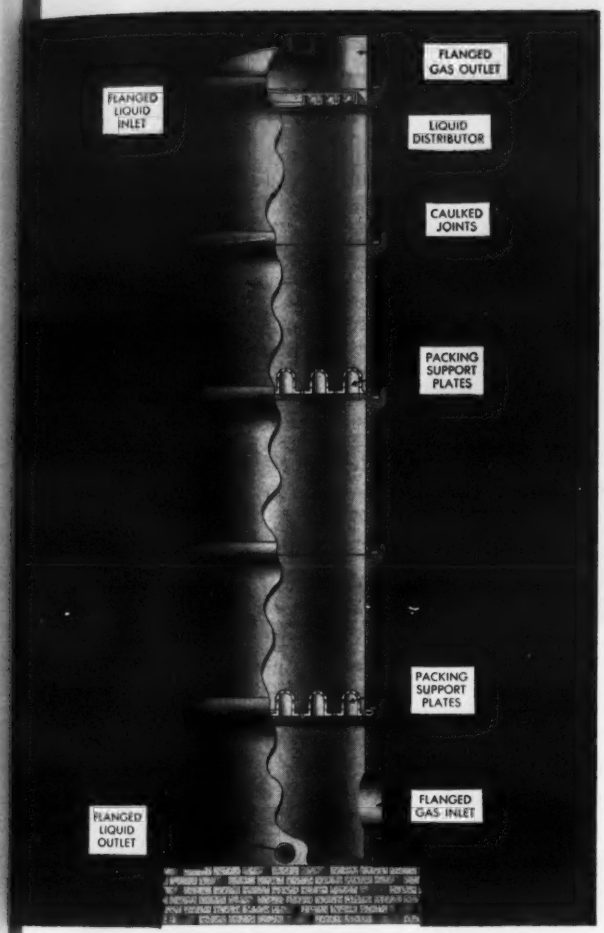
The "Cross-Flow" Fume Scrubber provides high efficiency in relatively small space. It is so designed that the gas flow and liquid flow are perpendicular to each other . . . the liquid flow vertical, gas flow horizontal. The effective liquid distribution over a cross-section area that is large in relationship to the thickness of the packed bed results in a highly active surface area capable of handling gases at high velocity rates with minimum pressure drop.

The "Cross-Flow" Fume Scrubber is built in six standard sizes with capacities ranging from 3,000 to 32,000 cfm. The unit is fabricated from heavy steel plate lined with 3/32" Tygon. Distributor is rigid plastic. The screen grid can be stainless steel or plastisol-covered wire mesh.



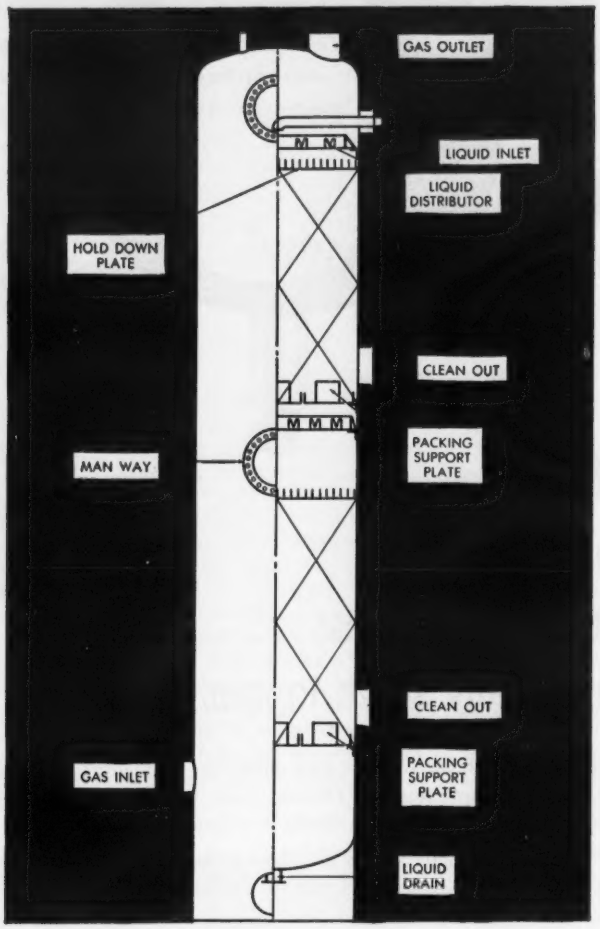
The unit illustrated above was designed for roof mounting, hence the gas inlet is located at the bottom. The unit, however, can be furnished with gas inlets located as desired.

FUME REMOVAL PROBLEMS



Ceramic Fume Washers

For some applications, fume scrubbers made from chemical ceramics represent the best and most economical approach. Ceramic fume scrubbers can be provided in diameters up to 48", in heights up to 60 feet or more. Ceramic support plates, ceramic distributors, and ceramic pipe and fittings complete a virtually universal corrosion-resistant fume removal unit. Standard towers are made with either bell-and-spigot construction or with cemented-on-metal flanges and are available in chemical porcelain, standard stoneware or "Ceratherm-550" heat-shock resistant stoneware.



Custom-built Metal Scrubbers

By far the largest number of fume removal applications involve the use of equipment custom designed and built to the user's specific requirements. The unit illustrated is typical of many such towers we have built in sizes ranging up to 8'-10' in diameter and as much as 80 feet high. The units may be lined with Tygon sheet lining or rubber, or unlined. Either metal, carbon, or ceramic support plates and distributors may be employed. Packing may be ceramic or carbon Intalox Saddles or Metal Pall Rings according to the nature of the gas and scrubbing agent.

Continued research in packed column technology enables U. S. Stoneware to offer fume scrubbers of most advanced design and proven efficiency. The results of our engineering investigations and our practical "know-how" are always available, with no implied obligation to design and operating engineers. Write Engineering Dept., U. S. Stoneware, Akron 9, Ohio, or one of our major branches.

U. S. STONEWARE

AKRON 9, OHIO

New York 60 E. 42nd St. • Chicago 20 No. Wacker Drive • Los Angeles 908 So. Atlantic Blvd. • Houston 4101 San Jacinto

377-F

Check 1771 opposite last page

More CO_2 removal units for atomic subs

Contracts were recently awarded for 21 carbon-dioxide removal units for use in atomic submarines. Removal units or scrubbers incorporate standard industrial process for separation of carbon dioxide from gaseous mixtures.

Air of submarine is passed through absorber column where stream of amine absorbent removes carbon dioxide. Absorbent is reactivated in separate vessels and recycled continuously. Each unit is capable of removal of 15 lb/hr of carbon dioxide from air.

Carbon dioxide is expelled into sea in compressed form. It is dissolved without leaving bubbles.

(Units are to be manufactured by Girdler Construction Division of Chemetron Corporation, 222 E. Broadway, Louisville 1, Ky.)

Radioactive-element tracer reveals fuel composition in engine cylinder

Fuel and fuel-additive diet of each cylinder in automobile engine can be pinpointed by radioactive-tracer methods. Carbon-14 and two isotopes of hydrogen — deuterium and tritium — are used to tag fuel components. Quick-acting sampling valves take only 1/-1000 sec to snatch sample of each cylinder's feed. Concentrations are determined by radiation count of samples.

(Radioactive-element tracing of fuel composition in engine cylinders is development of Ethyl Corporation, 100 Park Avenue, New York 17, N.Y.)

Finishing systems for metal working and other industries are pictured and described in 12-page publication. Typical custom installations operating in automotive, appliance, and other plants are shown. Bul A-659 — Industrial Equipment Division, R. C. Mahon Co., East 8-Mile Road, Detroit 34, Michigan.

Check 1772 opposite last page.

Case Type No. 1279.

Case Type No. 1379 is Alumalife, while similar case Type No. 1079 is Cast Iron.

Case Type No. 1377.

In such cases DURAGAUGES® naturally serve longer

You have a choice of three case materials—Alumalife®, a special aluminum alloy, Cast Iron, rugged and durable, Phenol, tough and rigid plastic—plus the unique "Maxisafe" design when you specify Ashcroft Duragauges.

All three case materials use a chrome plated, die-cast retaining ring to keep out harmful fumes and dirt. Case construction simplifies servicing—the entire system can be easily removed for recalibration or repair.

The "Maxisafe" case provides absolute protection to the viewer, easy and quick access to the tube and movement assembly. An integrally cast solid wall separates the dial from the tube and movement. A safety cover plate on the back is held in position by a knurled knob.

Regardless of your gauge case requirements, there's an Ashcroft Duraguage to do the job. Contact your local Ashcroft Gauge Distributor for complete facts.

Ashcroft Duragauges are available in pressure ranges from 15 psi (or vacuum) minimum to 100,000 psi.

CASE MATERIALS, TYPE NUMBERS, MOUNTING AND SIZES

CASE	TYPE NO.	BACK FLANGE	MOUNTING		CONNECTION		DIAL SIZE
			WALL	FLUSH	LOWER	BACK	
Black Alumalife	1379	Yes	Yes	Yes	Yes	Yes	4½", 6"
Black Cast Iron	1079	Yes	Yes	Yes	Yes	Yes	4½", 6", 8½" 10", 12"
Black Phenol, Turret Design	1279	No	Yes	Yes*	Yes	Yes	4½", 6", 8½"
Black Alumalife**	1377	No	No	Yes	No	Yes	4½", 6", 8½" 10", 12"

*May be flush mounted by using Flush Mounting Ring, Catalog No. 1278.
**The 10" and 12" dial sizes are made in cast iron only.

ASHCROFT PRESSURE GAUGES

A product of

MANNING, MAXWELL & MOORE, INC.

Consolidated Ashcroft Hancock Division • Stratford, Connecticut
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

Check 1773 opposite last page

IDEAS

Propellant lab finished by U.S. Rubber

Will conduct research on solid fuel components

Research on solid fuel propellants for military rockets and missiles is being conducted at United States Rubber Company's new laboratory in Naugatuck, Conn. The one-story brick and steel structure has approximately 1000 sq ft of floor space and contains all necessary equipment to make and test solid fuels on a small scale.

The lab will be used primarily for company-sponsored research on solid fuel components. For the past three years the firm's chemical division has been experimenting in this field. Work progressed to a point where separate research facilities were needed.

(Information courtesy of United States Rubber Co., 1230 Avenue of the Americas, New York 20, New York.)

Walk-in test chamber

. . . for missile-component testing has altitude range of ambient to 100,000 ft; temperature range of −100 to +300°F; and relative-humidity range of 20 to 95%.

Chamber size (10′ high X 8′ wide X 12′ deep, interior) requires three-ton door. However, suspension from trolley and rail permits pushbutton operation and eliminates need for wide swing area. Altitude condition of chamber may be lowered to ambient and door may be opened from inside.

(Walk-in test chamber is product of The American Research Corp., Farmington, Connecticut.)

Check 1774 opposite last page.

With expanded production and new plants multiplying the load on quality control facilities, Petroleum Chemicals, Inc. turned from low-temperature fractionating apparatus to gas chromatographs that . . .

Raise Sample Analysis Rate, Improve Accuracy

THEODORE W. WETT
Associate Editor
with A. L. WRIGHT, Chief Chemist
Petroleum Chemicals, Inc.
Lake Charles, La.

Problem: Squeeze was on in quality control sampling lab of Petroleum Chemicals, Inc. Slow, low-temperature fractionating apparatus was proving inadequate for rapidly expanding sampling needs. In particular, ethylene and ethylene oxide plants required sample test results faster than was possible.

In early 1955 company purchased a government-owned butadiene plant at Lake Charles (capacity 80,000 tons/yr after expansion). In time, new plants were built to produce anhydrous ammonia (100,000 tons/yr), ethylene (100,000 tons/yr), and ethylene oxide (8 million gal ethylene glycol/yr) facilities.

For feedstocks, samples are analyzed as materials arrive and at each step of pre-production preparation. Intermediate product testing and finished product sampling is also required. With four low-temperature fractionating units and one infrared spectrophotometer, an average of 15 samples was produced daily or up to 25 per 24-hr day.

Solution: About two years ago, lab installed a gas chromatograph to take over work load of all four low-temperature fractionating units. This has since been increased to six units.

Instrument Operation

Two models are used to provide added versatility although both operate on same principle.

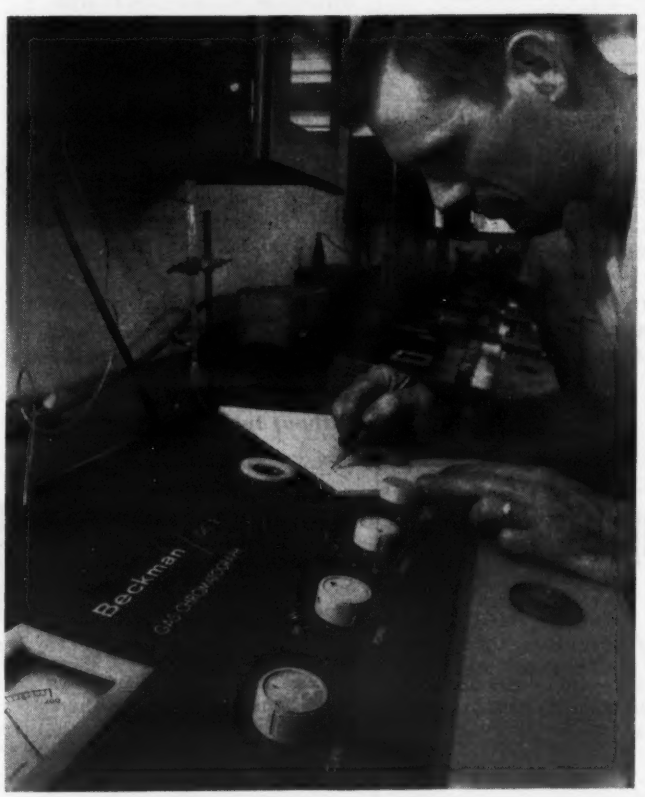
Carrier gas (helium from portable storage tanks) flows through pressure regulator and filters to each of dual capillary orifices. One stream passes through one-half of detector cell as a reference.

Other stream picks up sample from septum inlet or gas sampling valve, and carries it through coiled chromatographic column. Components of sample have different affinities for material in column, and are thus flushed through at different times.

As vapor passes out of column, it goes through sensing half of detector cell, where it is compared with reference. Difference in thermal conductivities between two sides of cell produces a voltage imbalance. Resulting signal is transmitted to recorder which plots a curve showing separation of sample into its components. Reproducibility is $\pm 0.1\%$.

In model GC-2 (four are used), all system components contacting samples are of stainless steel construction. Unit will handle gases and liquids boiling up to 350°C. Model GC-1 (two used), handles gases and liquids boiling up to 80°C. A variety of carrier gases can be used with either unit. Accessory columns are available to cover a wide range of compounds. Swagelok fittings make column changing fast and easy, minimize leakage.

Samples ranging in quantity from 100 to 4000 ml are taken



Gas chromatograph performs in 30 min, with greater accuracy, analysis that formerly took at least two hr. Sampling capacity has been increased by as much as 400%

Operator adjusts temperature-range control on model GC-2. Unit handles gases or liquids boiling up to 350°C

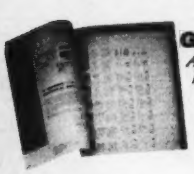
Neptune "Meter with a Memory"

never forgets the formula

Why waste a good man's time counting buckets, remembering formulas, waiting for liquids to creep up to gauge marks, repeatedly running the risk of counting or reading errors?

Let the precise "mechanical memory" of this Neptune repeating Auto-Stop meter do the work. Set the quantity required by the formula just once. Open the valve. The meter does the rest... shuts off automatically at the exact amount. Even prints a batch ticket if you want. The meter "remembers"...delivers the same amount each time the valve is opened until reset for a different quantity.

A meter helps a good operator produce more, with consistently better quality, less back-breaking work, and better housekeeping. Investigate this cost-saving meter today. Our field engineers will be glad to help.



GET THE FACTS
Ask for helpful Meter Data Bulletin 566 Y P. See Neptune Data Pages in Chemical Engineering Catalog.

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NEPTUNE METER COMPANY
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Check 1775 opposite last page

at four-hour intervals from pipelines and production systems. Analyses indicate whether adjustments must be made in production apparatus.

Results: An analysis that took at least two hours with former units can be performed by gas chromatograph in only 30 min. Sample analysis rate has been increased to 100 to 125 per day, with additional capacity still available.

Purity of various products is clearly shown to an extremely accurate degree by chromatographs. For example, purity of ethylene product must be a minimum of 99.7%. In all cases the chromatograph has recorded true readings (in agreement with other established methods) with faster results.

Instruments have proven more flexible in analysis, actually uncovering components that had not been known to exist in samples. Identification of these could result in possible improvements in production efficiency.

Equipment operates reliably 24-hr per day, seven days a week. An additional advantage observed with chromatographs. New personnel can be trained to use the instrument in 1/10 of time required with low-temperature fractionating equipment.

(Gas chromatographs are a product of Beckman/Scientific and Process Instruments Div., Beckman Instruments, Inc., 2500 Fullerton Rd., Fullerton, Calif.)

Check 1776 opposite last page.

Separate-cell polarograph without tubes

Uses: Chemical analysis of solutions.

Features: Polarograph has no tubes. It needs no batteries except for mercury cell used as voltage standard. DME-type cell is separate unit.

Description: Range is −3 to +2v, covered in four overlapping ranges. Unit provides 400:1 sensitivity range. There are nine sensitivity levels, from 0.025 to 10 microamperes per scale division.

Outstanding Accuracy

PALMER

Dial Thermometer

Check these functional features

- Direct-drive Bourdon Coil with a filled system for longer lasting accuracy.
- Stem can be placed at any desired angle and case can be rotated to most readable position.
- External calibration for zero setting.
- Unaffected by stem alignment.
- Accurate to one scale division.
- No sticking at any temperature.
- Non-corrosive case.

PALMER

THERMOMETERS, INC.
Mfrs. of Industrial Laboratory, Recording and Dial Thermometers
2515 Norwood Ave., Cincinnati 12, O.

Check 1777 opposite last page

New!
ELGIN Junior 120* DEIONIZER

For:
Laboratory
Research
Commercial
Industrial uses

Delivers up to 120 GPH of *high quality deionized water

Now a deionizer that fills a long felt need — a unit for those whose needs are not great enough to justify a large deionizer, but too great to be handled by small, portable laboratory apparatus. It gives you high quality water comparable to that produced by the Elgin mixed-bed Ultra Deionizer — water actually freer from mineral impurities than distilled water . . . at continuous flow rates up to 120 gallons per hour, and at remarkably low cost!

Illustration tells story. This compact unit — only 45" high — comes to you complete and ready to go. Hooks right into your water supply line. Delivers demineralized water under line pressure any place you want it. Handsome stainless steel cylinder contains four bags of resin ion exchange material that does the work. When resistance of effluent falls below 50,000 ohms (the measure of commercially distilled water) built-in ohm meter actuates pilot signal and you replace spent material with fresh bags which are supplied right with the unit. Then you return the exhausted bags to Elgin in convenient shipping container which we furnish. We then promptly regenerate it and return it to you so that *you always have a fresh supply on hand* . . . a planned and organized service. There is: —

No regeneration — no acid or alkali to handle — no backwashing — no drain needed — no trained operator required. Our well organized resin exchange service does the whole job for you. Cost of equipment and service is low. Final result: continuous supply at way below distilled water costs.

Write for facts

ELGIN SOFTENER CORPORATION
180 N. Grove Ave., Elgin, Illinois
Representatives in principal cities
In Canada: G. F. Sterne & Sons Ltd., Brantford

Check 1778 opposite last page

Continuously variable damping permits regulation of galvanometer or recorder-pen swing. This gives easier reading at higher sensitivities. Built-in zero shifter allows movement of electrical zero of galvanometer or recorder in either direction for full width of scale.

Polarograph is 21" long, 15" front-to-back, and 12" high. It operates directly from 115v 50/60-cy AC. Unit is supplied with mercury cell, line cord, connecting cable for a cell, and bottles of test-base and test-ion solutions.

(Model 65 Electropode is product of Fisher Scientific Company, 717 Forbes St., Pittsburgh 19, Pa.)

Check 1779 opposite last page.

Up to 100 operations recorded by monitor

Uses: Monitoring of control-processing equipment; checking automated production lines; traffic monitoring, and testing of telephone-switching equipment.

Features: Unit will record, simultaneously, up to 100 separate and distinct operations and events on moving 12" wide chart.

Description: Operations monitor has response rate of up to 500 signal changes per second and instantaneous chart-speed selection by local or remote control. Preprinted-chart-paper roll has 500' capacity.

Dimensions of monitor are 19 x 15-11/16 (panel) x 17½" (deep). Power is from 105/125v 60-cy AC. Unit weighs 100 lb.

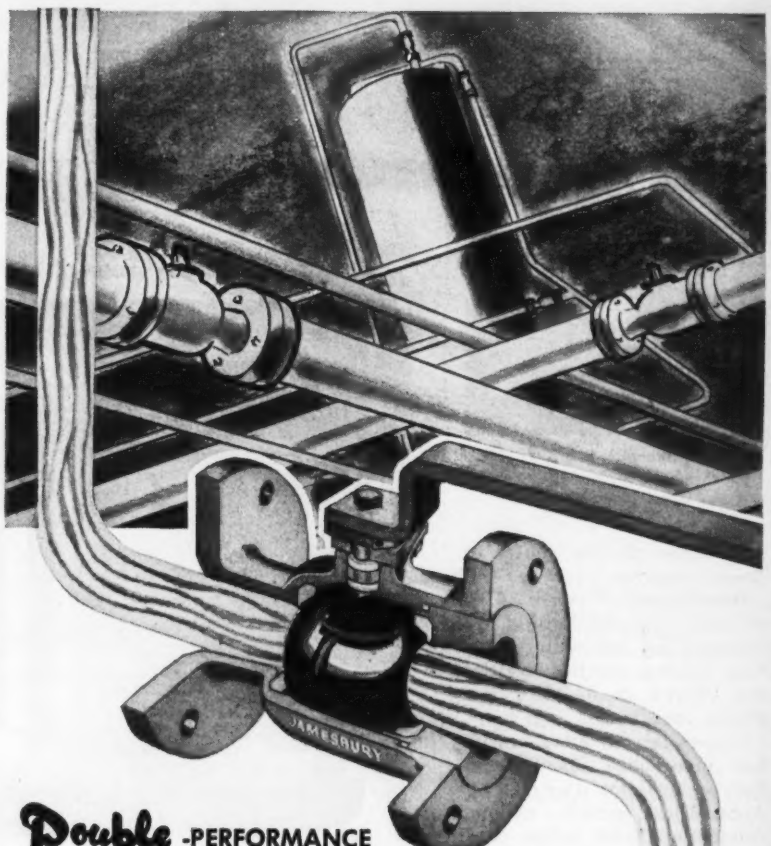
(Operations monitor is product of Brush Instruments, Division of Clevite Corporation, 37th and Perkins, Cleveland 14, Ohio.)

Check 1780 opposite last page.

Potentiometer and bridge instruments incorporating motor-driven null-balance principle are reviewed in Dynamaster Data — The Bristol Company, 141 Bristol Rd., Waterbury 20, Conn.

Check 1781 opposite last page.

jamesbury "Double-Seal" Ball Valves
Give Double-Value



Double -PERFORMANCE

Wherever the Jamesbury "Double-Seal" principle is employed in its multiple industrial applications, "Superior performance" is the phrase heard everywhere.

PERFORMANCE — the direct result of the high-efficiency and the long, maintenance free life of the Jamesbury product: "Double-Seal" Ball Valves.

Ball Valves in pipe sizes ¼" to 8" in Bronze, Aluminum, Stainless Steel, Carbon Steel. PVC ½" to 4". Quarter-turn.

Distributors In Principal Cities.
Get The Complete Facts On The Jamesbury "Ball Valve" Principle.

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☐ Distributor Service

JAMESBURY CORP., 65 NEW STREET, WORCESTER, MASS.

Check 1782 opposite last page

V215 MAY 59 XUM

All-glass reaction kettle has 20-gallon capacity

Uses: Processing of pharmaceutical and chemical products in intermediate-volume range between small-scale laboratory runs and pilot-plant or full-scale production.

All-glass reaction kettle of 20-gallon capacity is said to be largest ever made

Features: Kettles go up to 20-gal capacity.

Description: Pyrex-brand all-glass reaction kettles are designed for use with multi-zone heating mantles. Kettles are offered in 5-, 10-, and 20-gal capacities.

Covers are available with five pipe-flange openings or five socket-joint openings. Accessories include clamps, condensers, inlet tubes, caps, and thermometer walls. Special glass accessories can be ordered.

(All-glass reaction kettles are product of Corning Glass Works, 1946 Crystal St., Corning, New York.)

Check 1783 opposite last page.

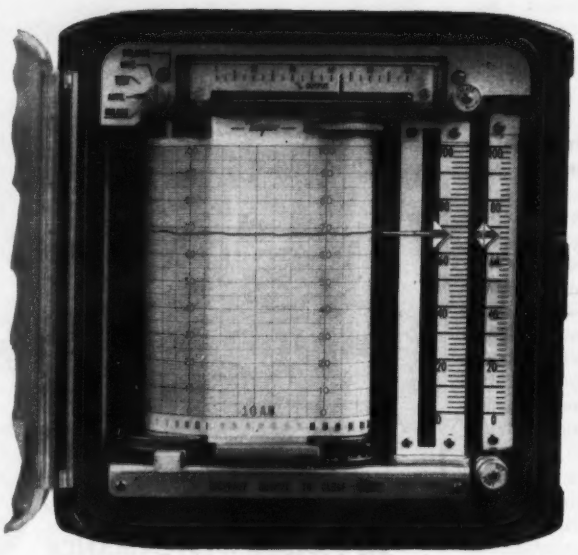
High speed, sensitivity at moderate cost with gas chromatograph

Unit will handle compounds boiling at 275°C

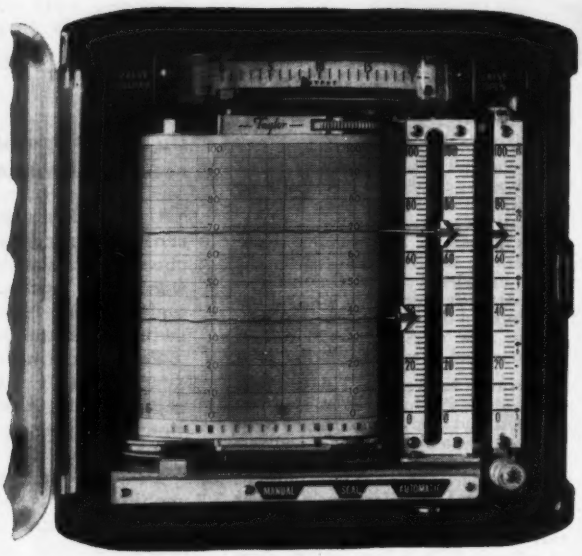
Uses: Separation and analysis by gas chromatography of either liquids or gases.

Features: Dual column switching arrangement com-

All Process Engineers: Compare Features of the New Taylor Electronic AC or DC Recorder and the exceptional TRANSCOPE* Pneumatic Recorder (90-J)



701J AC or DC Electronic Recorder



90J Transcope Pneumatic Recorder

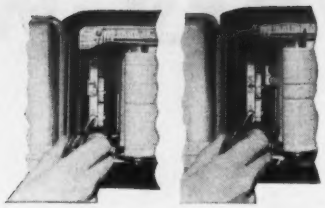
NEVER BEFORE SO MANY FEATURES IN SO LITTLE PANEL SPACE

1. Unconfused Readability. Because chart record, pen and set-point are side-by-side, whether electronic or pneumatic. Target-type pens and pointers are easiest of all to see, even at a distance. The 4″ chart reads from left to right—like a newspaper—on rectilinear coordinates. Thus, operators are encouraged to make frequent readings . . . and they make fewer mistakes because all pertinent data is lined up.

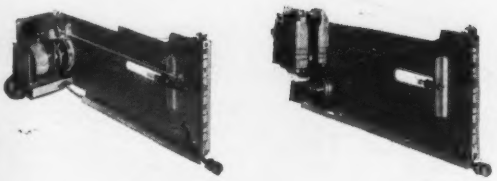
*Reg. U.S. Pat. Off.

LOOK TO TAYLOR FOR

Taylor Instruments

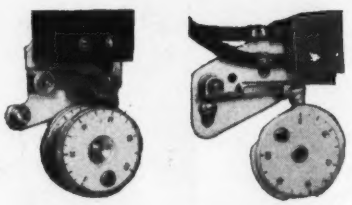


2. Front Adjustments—a Taylor 'first'. Controller response adjustments are quickly and easily made from the front, where results can be watched, on both Electronic (left) and Pneumatic (right) instruments. You can visualize immediately all pertinent process information—record, pen and set point.



3. Plug-in Set Point Transmitters, parallel to and exactly matching chart range, permit comparison without confusion and accurate adjustment of the control point. Separate set point transmitter enables you to stay on fully automatic control, even when recorder slide is removed.

4. Powerful Servo Motors give more precise pen positioning than ever before. More accurate records. Unmatched threshold sensitivity. Unparalleled power permits use of process alarms, new inking system and elimination of flimsy linkage.



5. Built-in Process Protection. Integral heavy duty alarms can be standard or hermetically sealed for Class I, Group D, Div. 2. Each cam may be set for high or low level or high-low. Contacts can be normally open or normally closed. "Memory Pointers" indicate *magnitude* beyond the alarm setting of the process variable. Cost is substantially less than conventional systems.

See your Taylor Field Engineer or write for appropriate Bulletin.
Taylor Instrument Companies, Rochester, N. Y., and Toronto, Ontario.

VISION • INGENUITY • DEPENDABILITY

MEAN ACCURACY FIRST

Check 1784 opposite last page

bined with automatic backflush makes rapid analysis possible. Chromatograph can be used to separate compounds with boiling points up to 275°C.

Description: Automatic electronic proportional temperature control with a 10-turn potentiometer for set-point adjustment permits resetting to within 1/2000th of span. A choice of detectors is available, either filament or thermistor type. Unit is 33⅛" high; 21½" wide; 14½" deep; and finished in grey hammertone.

Gases are introduced through reproducible sample valve. Liquids are reproducibly introduced with a precision micro-syringe.

(Model 11 Chromat-O-Flex is a product of Loe Engineering Co., 237 N. Fair Oaks Ave., Pasadena, Calif.)

Check 1785 opposite last page.

Sectional steel furniture for laboratory use is described and cataloged in 24-page brochure. Cat W-4—Laboratory Furniture Company, Inc., Mineola, Long Island, New York.

Check 1786 opposite last page.

"What a lousy place to work! Every 15 minutes an alarm clock goes off on the intercom system!"

Polyethylene beakers, jugs

. . . have handles for convenience and safety. Beakers are molded in one piece of extra-heavy-wall polyethylene. They are available in 1250- and 2500-ml sizes and are graduated in pints and ml.

Dispensing jugs each have a ⅝"-diam spout, fitted with plug permanently attached. Jugs are available in five- and two-gallon sizes. Larger has polyethylene screw closure. Smaller has 100-mm phenolic closure with 3-½" mouth opening.

(Polyethylene beakers with handles and polyethylene dispensing jugs are product of The Nalge Co., Inc., PO Box 365, Rochester 2, N.Y.)

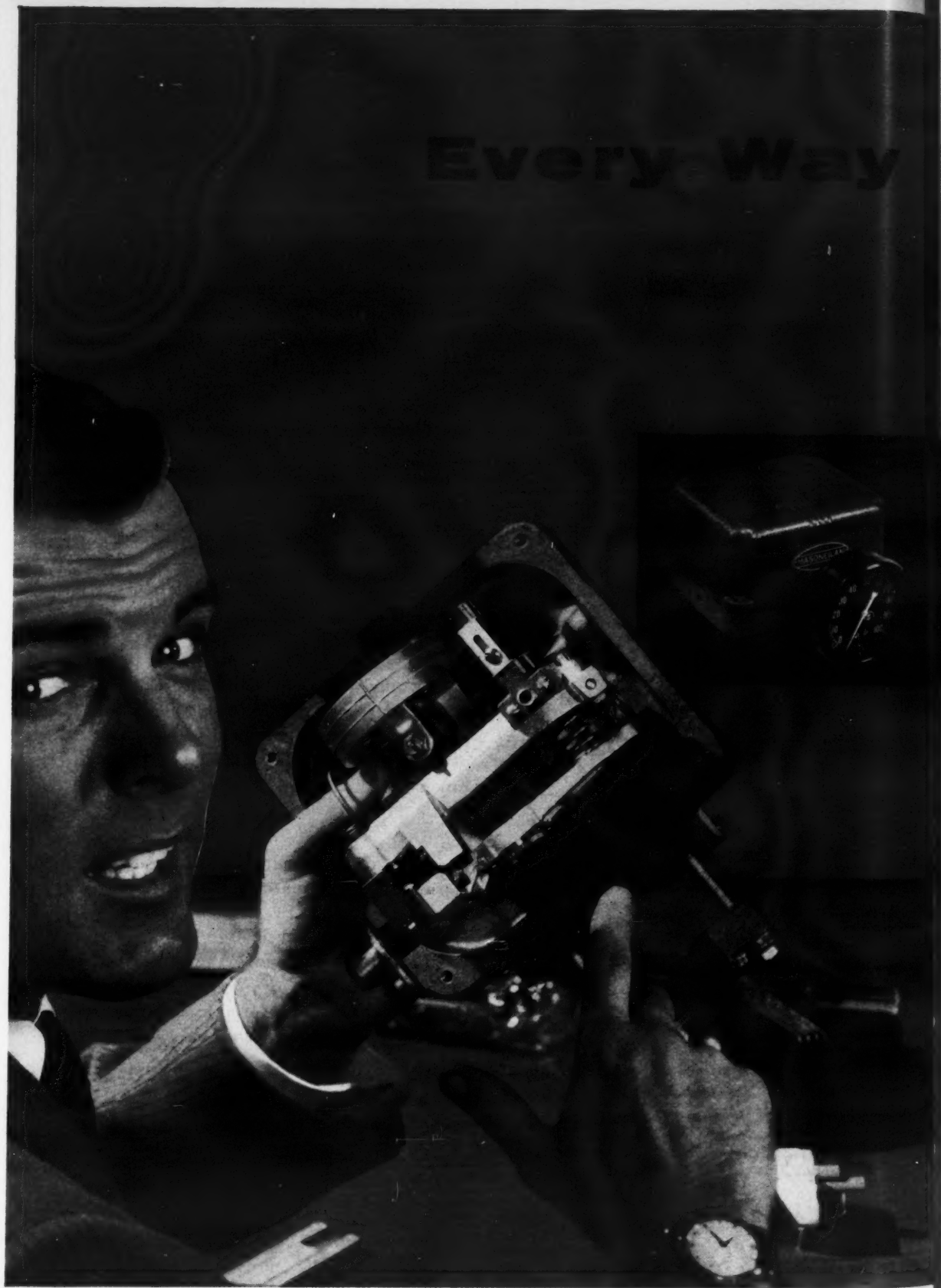
Check 1787 opposite last page.

All-electric actuator gives automatic or remote positioning

Uses: Automatic or remote manual positioning for throttling controls of valves, dampers, louvres, metering pumps, speed changes. Can be used for on-off remote pushbutton control with optional position indication.

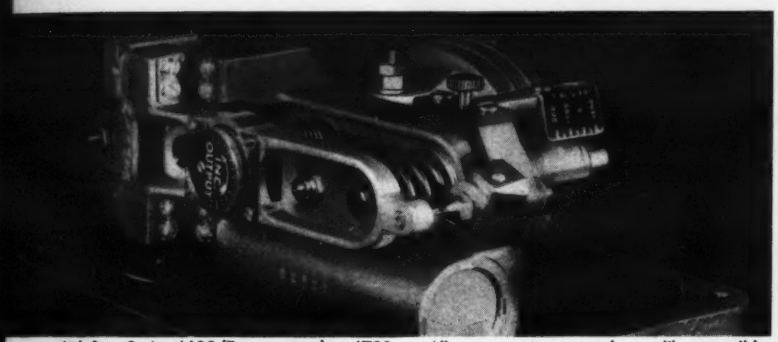
Features: Rugged, compact, light weight. Over-all assembly of actuator and yoke is only 26" high, weighs less than 35 lb.

Description: All-electric actuator affords precise proportional positioning by slidewire feedback used in conjunction



You Look At It!

New Masoneilan Transmitter Offers High Performance, Ease of Installation and Maintenance



At left — Series 4600 (Temperature) or 4700 (Pressure) Transmitter is housed in a weatherproof aluminum case, with blue Hammertone finish. Weighs only about 8 lbs.

All components are made readily accessible by simply removing the cover. Simple, unitized construction makes everything compact, yet easy to adjust and maintain.

Derivative unit is easily mounted to base plate without tubing or fittings. Integral mounting of receiver gauge on front edge of base plate is also optional.

One look at the Masoneilan Temperature or Pressure Transmitter will show you its simple, compact and rugged design. All of the elements have been neatly tailored into a 7" x 6" area, only 3¾" high; yet all adjustments are visible and easily accessible — performance is accurate and dependable.

Unitized construction is a major advancement. All sub-assemblies can be easily changed or removed individually, without disturbing the beam assembly. And the Derivative unit and Receiver Gauge may be integrally mounted on the base plate, requiring no tubing or fittings.

The new Masoneilan Transmitter is easily and quickly mounted to a pipe or flat surface — in any position found convenient, because the balanced beam eliminates zero shift.

This is your kind of instrument — built for dependable operation and easy maintenance! Send for new Bulletin which provides complete data and specifications.

MASON-NEILAN

A Division of Worthington Corporation

25 NAHATAN STREET, NORWOOD, MASSACHUSETTS

District offices or Distributors in principal cities in U.S.
In Canada: Mason-Neilan, Division of Worthington (Canada), Ltd.

MN7-32

Check 1788 opposite last page

with one of several voltage balance systems now on market. It is available in variety of travels from ½ to 4", with maximum thrust of 700 lb. Stroking speeds are from 8.5"/minute at 100-lb load to 2.5"/minute at 700-lb load.

(Model D-62XW electric actuator is product of Dept. D-6, Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.)

Check 1789 opposite last page.

Fluid-flow translation into electric signal of .002 gpm rate

Operating-fluid calibration gives 1% accuracy

Uses: Translation of fluid flows, at high static pressure and temperature, into linear electric signal. Applications in stationary installations such as engine or servo-valve test stands, laboratory evaluations of hydraulic systems, and industrial process control.

Features: Unit senses flows as low as 0.002 gpm. Flow-rate accuracy is 1% of flow rate when calibrated with operating fluid.

Description: Flowmeter is miniature variable-area type. Body of fixed size moves in tapered tube. Differential-transformer core is attached to body. Output voltage of transformer is determined by position of body in core. This position, and therefore output voltage, is function of rate of fluid flow.

Maximum working pressure of corrosion-resistant unit is 3500 psi. Pressure drop in most ranges is 2 psi. Maximum fluid temperature is 250°F. Higher maximums are available on special order.

Voltage output is linear relative to fluid-flow rate within 0.5% over rated range. Excitation voltage is 3v 60-cy. Unit exhibits no hysteresis and has infinite resolution. It is 2" in diam, 9¼" long.

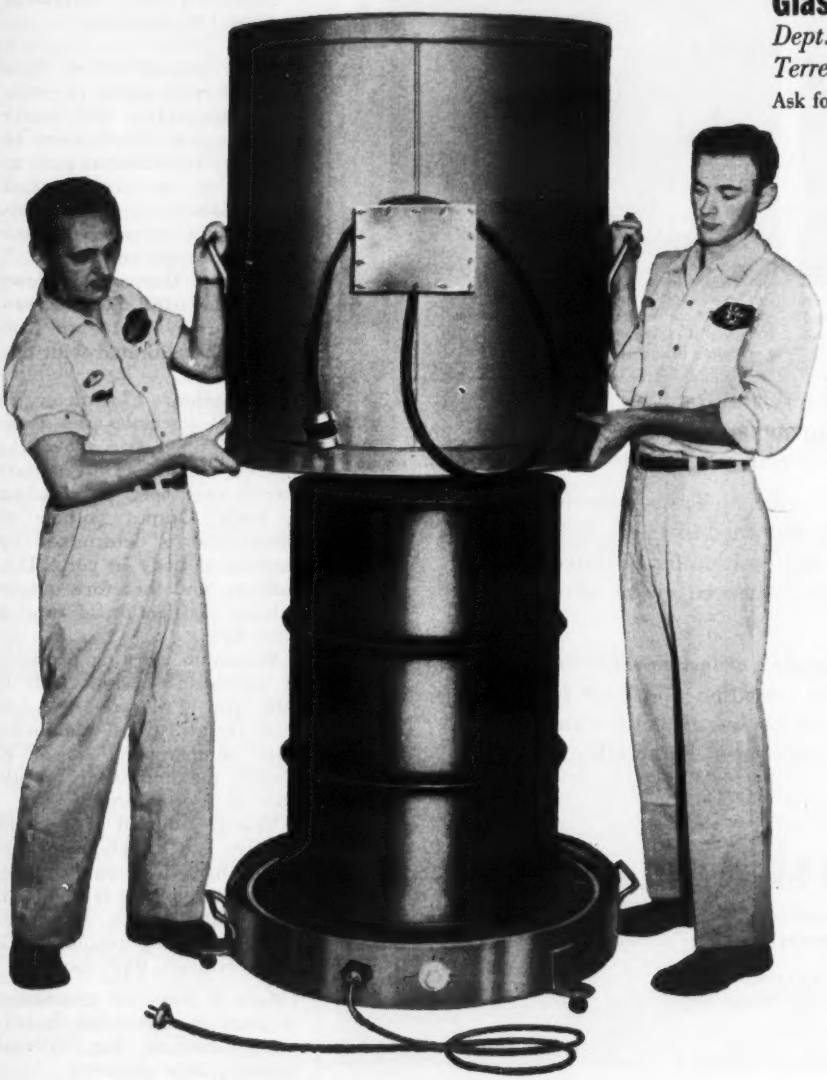
(Mark X flow-rate transducer is product of Ramapo Instrument Company, Inc., Bloomingdale, New Jersey.)

Check 1790 opposite last page.

FOR CONTROLLED HEATING OF | tars, asphalts, heavy oils, greases, paints, varnishes, pitches, resins, plastics, shortening, gelatinous materials . . .

Here's the NEW MODEL Glas-Col Complete Drum Heater. To use, place drum on heater base. Lower cylindrical part of heater down over the drum. Put cover on. Hook up the two leads. Cover, cylindrical and base unit completely enclose drum . . heating is rapid, safe. Heating elements, imbedded in rugged fabric, are close together. This insures uniform input . . no local overheating. Separate thermostats in base and cylindrical part of heater permit accurately controlled heating to 550°F. Rugged casters make loaded unit easily portable. Base part of heater (1800 w, 230 v), **$200** . . cylindrical part (6000 w, 230 v), **$340** f.o.b., Terre Haute, Ind. | (When ordering; please specify outer diameter of drum chimes. Base or cylindrical unit can be ordered separately.)

Glas-Col Apparatus Company
Dept. CP, 711 Hulman Street
Terre Haute, Indiana
Ask for 4-page descriptive bulletin DH-100.



Check 1791 opposite last page

Chromatograph for samples with 600°C boiling points

Uses: Separation and analysis of substances with boiling points up to 600°C. Also for standard chromatographic analyses above 50°C.

Features: Instrument has maximum operating temperature of 500°C. This is sufficient to vaporize samples with boiling points up to 600°C.

Description: Performance at high temperature is made possible through heat-shielding design and heat-resistant materials in analyzer. Temperatures can be regulated within ±0.5°C.

Heat sink is composed of bronze alloy which is corrosion-resistant at elevated temperatures. Entire oven assembly is heated and ventilated.

Modular design permits expansion of instrument as analytical needs change. Several analyzer units may be operated from single control unit. Each analyzer can employ different-type column, and changeover from one sample to another can be accomplished quickly.

Chromatograph has maximum operating temperature of 500°C, sufficient to vaporize samples with boiling points up to 600°C

(26-203 high-temperature chromatograph is product of Analytical and Control Instrument Division, Consolidated Electrodynamics Corporation, 300 North Sierra Madre Villa, Pasadena, California.)

Check 1792 opposite last page.

Built-in autotransformer with moisture balance

Uses: Determination of moisture content in materials, particularly those which are not chemically changed while losing water.

Features: Built-in autotransformer regulates voltage automatically and provides convenient temperature control.

Description: Drying is accomplished by infrared heat. Moisture balance is equipped with disposable weighing dishes. Dishes are ridged to keep liquids uniformly distributed in weighing pan and eliminate spillage.

Convenient temperature control is provided by built-in autotransformer of moisture balance

Built-in magnetic damper and extra torsion wire for 25-g samples are included. Balance is housed in solid-cast-aluminum case. Power is from 115v 60 cy AC.

(Moisture balance is product of Central Scientific Company, 1702 Irving Park Rd., Chicago 13, Illinois.)

Check 1793 opposite last page.

Gas-liquid chromatography involving rapid determination of fatty acids and fatty acid esters in industrial products and biological specimens is covered in four-page data sheet. Simple procedure for fatty acid determinations is explained. Data Sheet GC-89-B—Scientific and Process Instruments Division, Beckman Instruments, Inc., 2500 Fullerton Rd., Fullerton, Calif.

Check 1794 opposite last page.

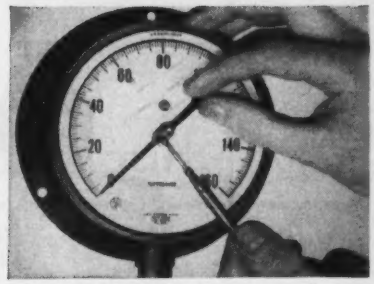
HOW A CLOSER LOOK AT GAUGE BUYING TODAY...

can help cut your gauge maintenance costs

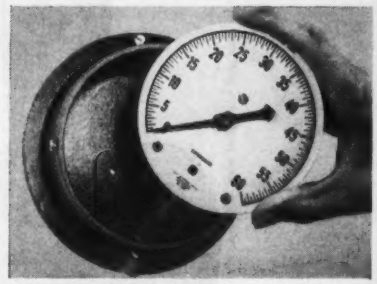
Been taking gauges pretty much for granted? As to the price you pay, accuracy you buy, performance you get . . . gauges you use and their maintenance costs? Maybe it's time for a closer look at the United States Gauge line and how it can streamline buying. USG features the most comprehensive line of indicating dial pressure gauges you can draw on . . . in range of case styles, materials and sizes, in pressure ranges and in price . . . up to the finest gauges money can buy. The *completeness* of the USG line can help you avoid over-buying, under-buying, help you get exactly the gauge performance you pay for . . . from one source! As shown at right, exclusive USG design features even help cut maintenance costs. Check your USG distributor for your next gauge requirement. See the Yellow Pages, or write for catalogs and name of your nearest USG distributor, today.

USG **UNITED STATES GAUGE**
Division of American Machine and Metals, Inc., Sellersville, Pa.

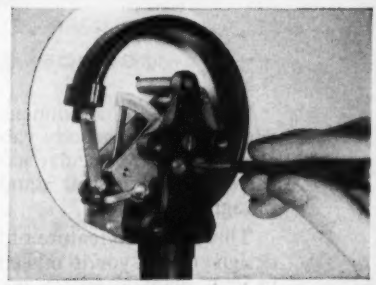
Find Your Nearest Distributor in the "Yellow Pages"



NOTE that with a USG Supergauge®, complete recalibrations can be made faster than with any other process gauge. For example: "zero shift" adjustments are made from the front with gauge in operating position, and without removing pointer from the shaft.



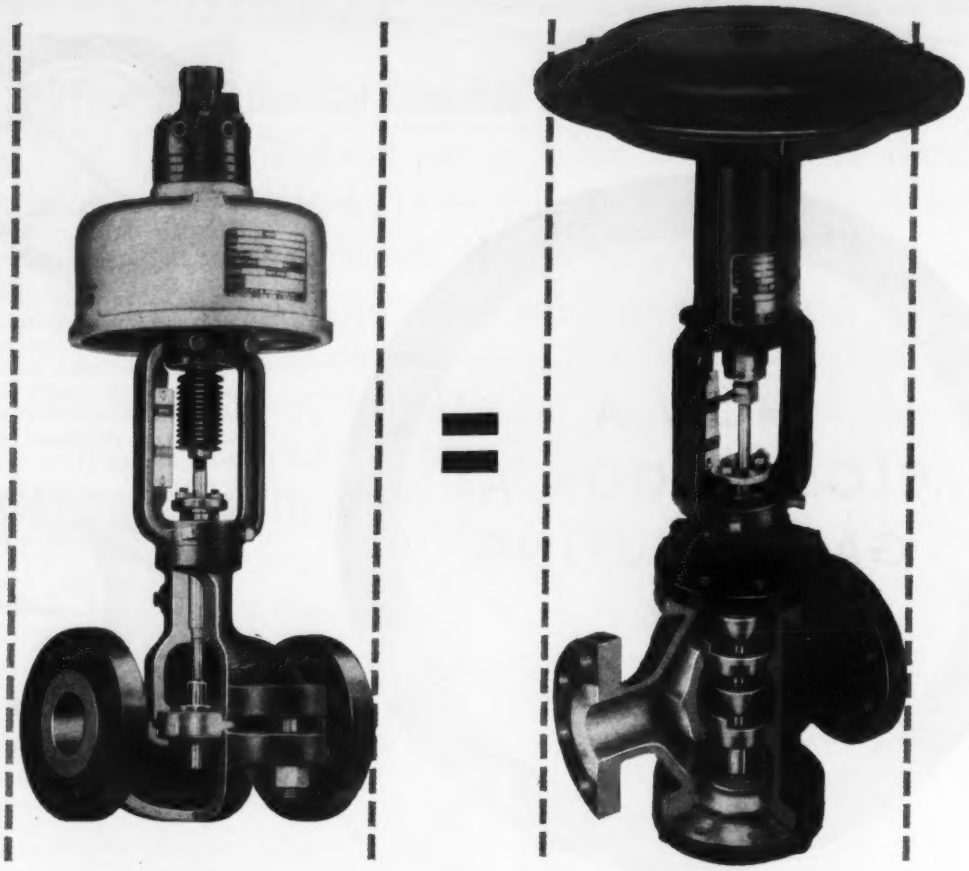
NOTE that with USG Mono-Unit design, internals are in one assembly which lifts out intact. Legend on dial gives full information for instant identification of model number and materials in components. More maintenance minutes saved!



NOTE that with USG Arc-Loc® movement, corrections for "scale shape" (linearity) errors and "range" adjustments are both made from the rear; no need to remove pointer and dial. USG's unique locking method eliminates creep during locking, saves more time! USG Supergauges meet A.S.A. standards for Grade AA Test Gauges, including accuracy to ½ of 1%. *Write for Catalog 1819.*

SAVINGS IN USG A-LINE, TOO!
Premium gauge construction at savings up to 40% of premium prices! Major economies in pressure measurement where you may now be buying more gauge than you need! Meets A.S.A. Grade A standards, including accuracy of 1%. Wide choice of options. Has Supergauge Mono-Unit design — cuts recalibration time. *Write for Catalog 305.*

Check 1795 opposite last page



"FIT" Companions

reduce costs . . . increase valving flexibility

With face-to-face dimensions to I.S.A. standards, K&M split body valves are interchangeable with K&M regular globe-body diaphragm valves (and with all standard makes of diaphragm valves).

This *exclusive* feature of the K&M split body design enables you to make significant reduction in your plant inventory investment of replacement valves. It gives you highly desirable flexibility.

Additional flexibility is provided in the K&M split body valve itself. Interchangeable. unitized construction makes it possible to develop 432 different valve combinations from a single split body.

In a matter of minutes you can make the body reverse or direct-acting; switch the operator to dome, diaphragm, or handwheel; change the seat ring to one of several types; recharacterize by selecting a different plug; substitute the replaceable, rotatable flanges; convert from globe to angle type.

The K&M split body valve fits your existing piping and fits your budget.

One more plus . . . K&M split body valves have the largest C_V offered in split body construction . . . more flow for your money.

Write for Catalog 132 completely describing the valve that brings the split body idea to its fullest development.

K&M

diaphragm control valves

KIELEY & MUELLER, INCORPORATED

Our 79th Year

Oldest Pressure and Level Control Valve Manufacturer

64 Genung Street, Middletown, New York

S-A. 1697

Check 1796 opposite last page

Measure gas moisture at sample pressures up to 10,000 psig

Uses: Rapid, accurate measurement of trace quantities of moisture in gases, gaseous mixtures, and vapors at sample pressures up to 10,000 psig. Some examples: testing moisture in pneumatic control systems, bottled cylinder gases, and process streams; monitoring hydrogen feed in ammonia plants; measuring dryer performance on compressors.

Features: A 63% response within 90 seconds to upward or downward step change in moisture content between 50 and 1000 ppm. Virtually independent of variation in sample composition, since electrolysis is specific to water.

Description: Series of high-pressure moisture monitors will accommodate high-pressure air, hydrogen, nitrogen, oxygen, natural gas, hydrocarbon vapors, helium. On instrument is rated for use at sample pressures up to 3500 psig, another up to 6000 psig, and a specially modified version up to 10,000 psig.

Based on Du Pont-developed electrolytic process, monitors cover dynamic range of one to 1000 ppm. Each is equipped with built-in high-pressure regulator, high- and low-pressure sample bypass, adjustable flow-control system, and plug-in, quickly replaceable electrolytic cell. Each has an indicating meter with adjustable alarm contact that may be set to open or close at any moisture level.

Self-contained battery pack permits portable use. Monitors can also be operated on 105 to 125v, 50/60-cy AC.

(Type 26-350 Series moisture monitors are produced by Consolidated Electrodynamics Corporation, 300 N. Sierra Madre Villa, Pasadena, Calif.)

Check 1797 opposite last page.

Manometers are listed in 12-page catalog including diagrams and design theory and data. Manometer Cat—Trimount Instrument Company, 3119 W. Lake St., Chicago 12, Ill.

Check 1798 opposite last page.

Lower air consumption marks 'thin-line' controller

Series used for pressure or temp control

Uses: Accurate regulation of temperature or pressure.

Features: Air consumption of instrument with a stable valve position is 25 cu in of free air/min, reported to be 66 to 75% less than other controllers. Design is 57% smaller over-all than conventional instruments for more compact surface or flush mounting.

Description: Indicating pneumatic controlling instrument has an adjustable 0 to 35% throttling range, manual reset, combination external or internal index setting. Diaphragm-operated valves permit gradual, accurate regulation of temperature or pressure.

Temperature ranges: −25 to 135°F; 25 to 250°F; and 150 to 375°F. Furnished from stock with 1 x 5″ copper or stainless bulb and 15-ft capillary.

Pressure ranges: 30″ Hg vacuum to 60 psi; 0 to 100 psi; 0 to 200 psi; and 0 to 350 psi.

Unit has 5⅜″ indicating scale for maximum visibility. Over-all dimensions are: 12¾″ high; 8-11/16″ wide; and 3-7/16″ deep.

(Automator is a product of The Powers Regulator Co., 3434 Oakton St., Skokie, Ill.)

Check 1799 opposite last page.

"As usual, some people were bound to get the wrong impression of our automation program. . ."

continuous

automatic

chemical

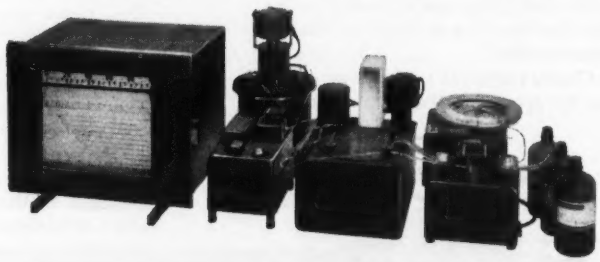
analyses

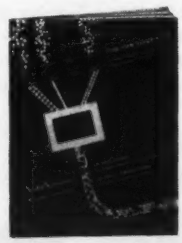
with the

TECHNICON®
AutoAnalyzer®

A single control system, the AutoAnalyzer provides highest precision quality control through continuous analyses of main stream production. You achieve product standardization at the highest level by controlling all process variables at the critical stage. It does away with slow, inaccurate, and expensive manual laboratory procedures. Integration of the Technicon AutoAnalyzer into your process stream insures product quality and production scheduling while eliminating the need for reruns.

The AutoAnalyzer is currently in use as a production control system in such diverse applications as pharmaceuticals, sugar and syrups, and boiler feed waters. Designed for simple, foolproof operation on the line or in the lab, the AutoAnalyzer requires no sample preparation or measurement. Completely self-cleansing, the system brings true automation to chemical analysis for the first time.





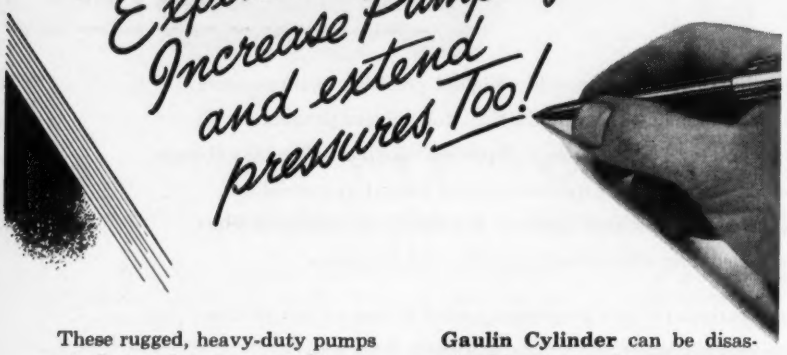
TECHNICON CONTROLS, INC.
212 Saw Mill River Road **Chauncey, New York**

Send for your free copy of this eight-page descriptive brochure plus detailed application data.

Check 1800 opposite last page

GAULIN TRIPLEX PUMPS

Turn in Lower Operating Expense Accounts... Increase Pumping capacity and extend pressures, Too!



These rugged, heavy-duty pumps are built to minimize operating, inspection and maintenance costs. They handle large volume of all types and densities of fluids.

Horizontal Design provides well area separating product from crank case.

Well Area can be gasketed for maintaining sterility . . . or for inert compatible chemicals (gases or liquid) for hazardous materials.

Gaulin Cylinder can be disassembled in minutes. Capacities from 50 to 6500 GPH . . . pressures from 500 to 12,000 psi.

Write for Bulletin P-55. At the same time ask for GTA . . . Gaulin Technical Assistance . . . for experienced advice and factual data on the best method to move or blend your product.

Check chemical engineering catalog for representative nearest you.

Send for the GTA library of product information.

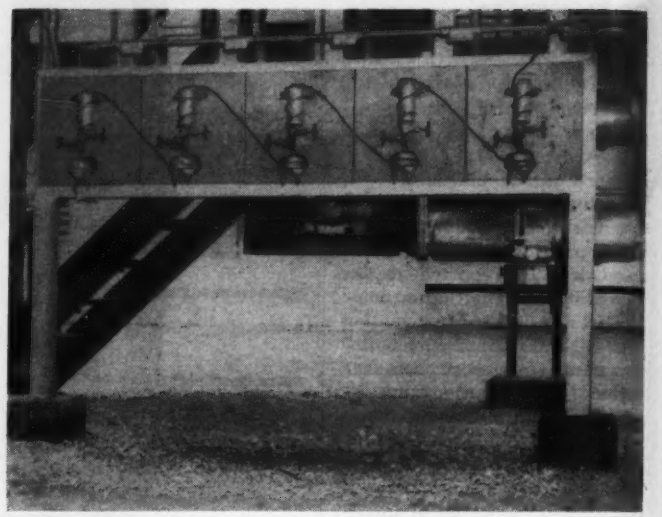
Gaulin TRADE MARK

MANTON Gaulin

55 Garden Street, Everett 49, Mass.

World's largest manufacturer of stainless steel reciprocating, rotary, pressure exchange pumps, dispersers, homogenizers and colloid mills

Check 1801 opposite last page



Sampling system and infrared analyzers for determining methane in process streams at Mississippi River Fuel Corp.'s Selma, Mo., ammonia plant

In production of ammonia by partial oxidation of natural gas, a close check on methane content in streams leaving reformers indicates reaction efficiency. By utilizing a specially designed sampling technique . . .

Infrared monitoring helps hold ammonia process efficiency

Successful, accurate infrared analysis of methane in process gas from five reformers at Mississippi River Fuel Corp.'s ammonia plant, Selma, Mo., helps maintain high reaction efficiency. Plant produces ammonia by partial oxidation of natural gas or refinery gas having a high concentration of methane.

Of extreme importance in process is measurement of residual methane immediately after reformers. Concentration of methane is an indication of reaction efficiency. When there are changes in temperature, or a change in methane content of feed stock, it is immediately apparent in reformer exit stream. When this change is spotted quickly, the operator can quickly make necessary process adjustments.

However, process gas after reformers is dirty and saturated at 400 psig, 450°F. Specially designed sampling system is used.

Sampling System

To sample process streams a sample probe is mounted in each six-inch line. Probe is connected to a welded, stainless steel water-cooled sample conditioner with a steel release trap, filter, and pressure reducer and regulator. Sample is cooled by water jacket and condensate collects in bottom of sample conditioner. As condensate builds up it causes steel trap to open and sample pressure forces accumulated condensate out.

Infrared Analyzer

Cooled, dried, clean sample is reduced in pressure and then passes to sample cell of infrared analyzer. Instrument consists of two infrared light sources, steel sample and comparison cells, a beam combiner, detector cell, an amplifier and a recorder. Light sources are small ribbons of nichrome wire heated electrically to 1300°F.

Beams are directed through the sample and comparison cells and then into beam combiner where they are converged and directed into detector cell. A shutter alternately blocks each beam thereby permitting comparison of amount of light reaching detector through each cell. Since unit is adjusted so that initial amount of light through each cell is equal, if gas placed in sample cell absorbs infrared an unbalance is created.

Detector cell generates an electrical impulse proportional to this unbalance, or the amount of light absorbed in sample cell. This absorption is directly related to gas stream composition and instrument can be calibrated for components desired.

By this system, methane in reformer's exit streams is quickly determined and recorded. Changes can be spotted and appropriate action taken to maintain top efficiency of conversion.

(Lira infrared analyzers and sampling system were supplied by Mine Safety Appliances Company, Pittsburgh 8, Pennsylvania.)

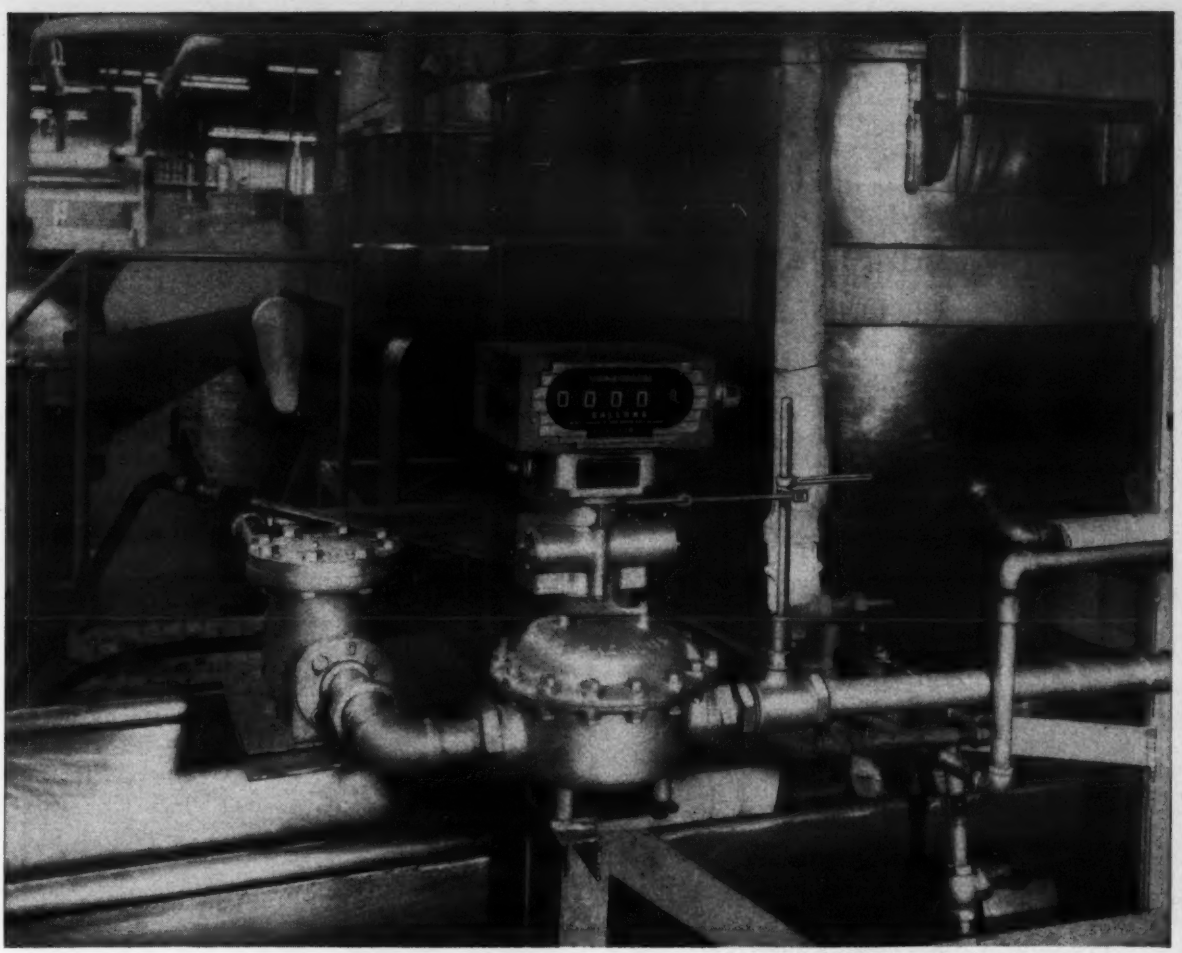
Check 1802 opposite last page.

Automatic controls are detailed in 74-page catalog including specifications and application data. Automatic Controls Cat—Lumenite Electronic Company, 407 S. Dearborn, Chicago 5, Ill.

Check 1803 opposite last page.

Temperature indicators, controllers, and transmitters are described in series of five specification sheets, 12-1451T-1 to 5, available from Fischer & Porter Co., 841 Jacksonville Rd., Hatboro, Pa.

Check 1804 opposite last page.



Rockwell Model ER Meter with automatic quantity control shut-off in food processing plant

Batch it, blend it, or just plain account for it!

IT'S GOOD BUSINESS TO METER ALL LIQUIDS

Wherever liquids are stored, mixed or used in plant operations, you can save time, money and improve efficiency with Rockwell industrial meters. With meters you can batch, blend and control formulas with precision. Handling volatile liquids, metering provides the safety of a closed piping system and guards against contamination.

Rockwell industrial meters are valuable accounting tools. Thousands use them for in-plant cost identification purposes, for inventory control—even to guard plant security.

You can measure most any piped liquid with Rockwell meters—oils, liquors, paints, chemical solutions—over 50 liquids in all. Use the coupon for full details.

CLIP COUPON—MAIL TODAY!

INDUSTRIAL METERS
another fine product by
ROCKWELL

ROCKWELL MANUFACTURING CO.
Pittsburgh 8, Pa.
Gentlemen:
I am interested in measuring _____ (Name of Liquid)
Pipe Size _____"
Working Pressure _____ psi Temperature _____ °F max.
Max. Flow Rate _____ gpm Min. Flow Rate _____ gpm
Your Name _____
Company _____
Street _____
City _____ Zone ____ State _____

Check 1805 opposite last page

One of America's Newest

ATOMIC REACTOR VESSELS

fabricated by

Struthers Wells

140,000# PRESSURE VESSEL FOR NUCLEAR AIRCRAFT RESEARCH

This 70-ton vessel was fabricated by the Struthers Wells Corporation for the Plum Brook Research Station of the National Advisory Committee for Aeronautics. It measures 9′ x 35′ and has a total of 68 openings of various kinds, all precisely located to tolerances of watchmaker precision. Made of stainless clad carbon steel, it has a mirror-finished interior and required extremely careful and time-consuming fabrication. When your big and complex fabrication requirements call for the best in experience and facilities, look to STRUTHERS WELLS.

Ready for shipment, this nuclear pressure vessel required a special "low-boy" flat car and a carefully planned route due to the unusual size and shape.

STRUTHERS WELLS PRODUCTS

PROCESSING EQUIPMENT DIVISION

Crystallizers . . . Direct Fired Heaters . . . Evaporators . . . Heat Exchangers . . . Mixing and Blending Units . . . Quick Opening Doors . . . Special Carbon and Alloy Processing Vessels . . . Synthesis Converters

BOILER DIVISION

BOILERS for Power and Heat . . . High and Low Pressure . . . Water Tube . . . Fire Tube . . . Package Units

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Crankshafts . . . Pressure Vessels . . . Hydraulic Cylinders . . . Shafting . . . Straightening and Back-up Rolls

STRUTHERS WELLS CORPORATION

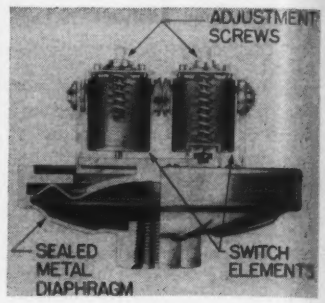
TITUSVILLE, PENNSYLVANIA

Plants at Titusville and Warren, Pa.

Offices in Principal Cities

Struthers Wells

Check 1806 opposite last page



Pressure, vacuum switch, now as stripped model, features dual setting

Can be mounted directly on vibrating equipment

Uses: Pressure and vacuum switch designed for use where controls are enclosed in a common cabinet.

Features: Stripped model operates in any position, resulting in lower installation costs. Can be mounted directly on moving or vibrating equipment.

Description: Recommended for liquids or gases, switch is available in pressures of 30″ Hg vacuum to 150 psi. It accurately senses any two pressures in the same system over an adjustable range of 30″ Hg vacuum to 100 psi.

Switch actuates two independent electric circuits at predetermined pressures, on both increasing and decreasing pressures. Easily accessible screws ease field setting. UL-listed single-pole, double-throw switching elements for AC and DC circuits are automatically reset by snap action of switch.

(Model 404 stripped pressure and vacuum switch is development of Pressure Switch Division, Barksdale Valves, 5125 Alcoa Ave., Los Angeles, California.)

Check 1807 opposite last page.

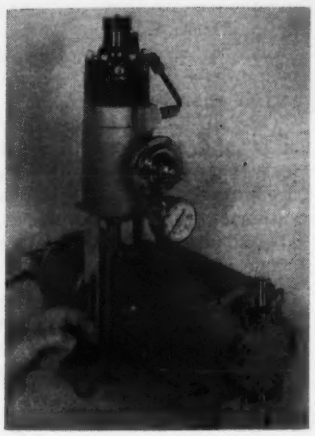
Metering of chemicals automatically controlled by pump

Uses: Metering chemicals automatically.

Features: Pneumatic device on pump adjusts pumping rate

as requested by signals from process instruments. Pump can handle from 1040 to 2300 ml per hr at 0 psi. Pressures up to 2000 psi are possible.

Description: Piston-diaphragm pump has air cylinder integrally mounted above stroke adjustment mechanism. Variations in air pressure (as controlled by sensing instrument) determine position of piston within cylinder. Pump's output is controlled by air



Air cylinder mounted above stroke adjustment mechanism automatically controls pump's output

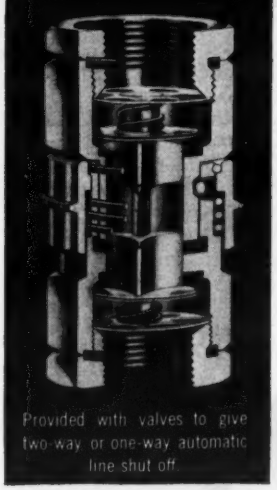
pressure variation from instruments with 3-15 psi range. Change in air cylinder's piston position is mechanically transmitted through a cam to pump's stroke adjusting mechanism.

Air cylinder also contains a "positioner" that effects rapid loading and unloading of cylinder. Device results in immediate, accurate push-rod positioning in response to slightest change in instrument air pressure.

Pump may be used with flow-orifice meters, flow rotameters, liquid level instruments, pH control meters, and temperature control instruments.

(Further information about Microflo Auto-Pneumatic and Pulsafeeder pump may be obtained from Process Equipment Division, Lapp Insulator Company, Inc., 100 Hall Street, LeRoy, New York.)

Check 1808 opposite last page.



Provided with valves to give two-way or one-way automatic line shut off

Built to handle high pressure hydraulic and pneumatic systems

Snap-Tite *valved* couplings stop flow instantly"

Snap-Tite provides instant shut-off wherever fluid coupling is needed.

Snap-Tite *valved* couplings connect and disconnect quickly and fully—they automatically open line flow when connected; positively seal your line when disconnected—with no "ifs," no chance for human error.

Snap-Tite couplings are available in sizes from ¼" to 6" ID, in steel, brass, aluminum, 303 ss and 316 ss. Sizes from 6" to 10" ID are available on special order. For more information, write for Snap-Tite catalog #58. Snap-Tite representatives are located in all principal cities.

SNAP-TITE COUPLINGS CAN HANDLE ALMOST ANYTHING THAT FLOWS

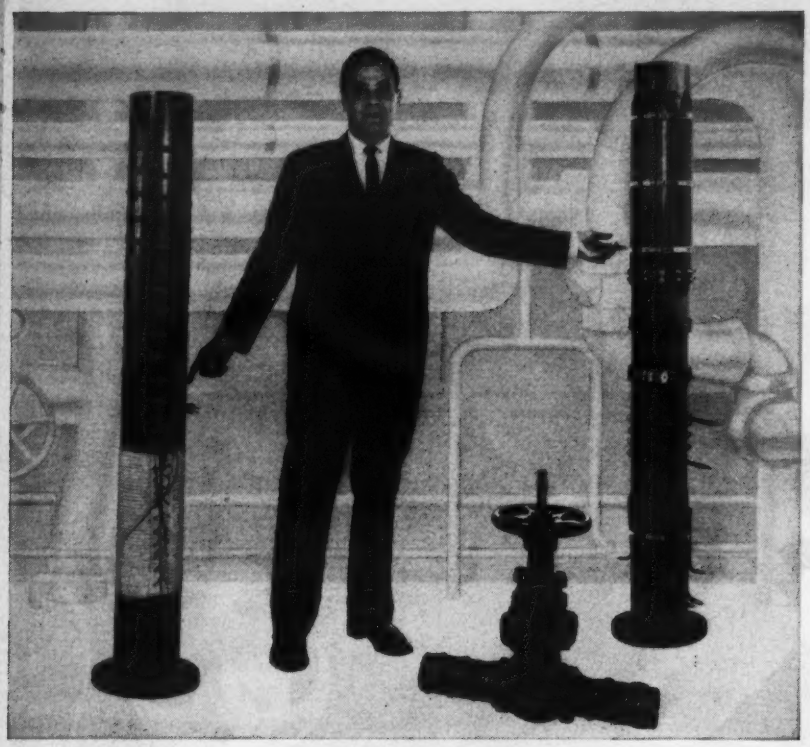
★ Snap-Tite

ST-59-01

SNAP-TITE, INC. • UNION CITY 6, PA.

Check 1809 opposite last page

What's the best way to heat a pipe?



Your CHROMALOX Man has the Answer

Your Chromalox Man can help you determine which of the above pipe heating methods is the one best electrical answer to *your* problem.

Maybe Chromalox Strip Heaters best meet your operating conditions. Quickly and easily installed at low initial cost, they provide uniform, accurate temperatures by either automatic or manual control. Lengths from 4" to 96" can be clamped in place side by side, or, half-round strip heaters may be bolted together to a minimum inside radius of 3½".

Or perhaps Chromalox Tubular Heaters are the answer. These versatile heaters are available in straight lengths or bent to any shape you may require.

Still other pipe heating problems can be solved quite simply by Chromalox Pre-Fab woven electric heaters, held in place by lacing, adhesives or snap-fasteners. Chromalox Thermwire Tape and Cable answer hundreds of other problems that can be solved by low temperature localized heat.

What's the best way for *you*? Just call your Chromalox Representative, listed at the right. He has the fast, clean, safe, accurate, economical ELECTRICAL ANSWER. He's backed by the world's largest stock of industrial electric heaters, ready for immediate shipment. And, he offers factory design engineering service for special applications.

4976

CHROMALOX
Electric Heat
INDUSTRIAL • COMMERCIAL • RESIDENTIAL
EDWIN L. WIEGAND COMPANY
7517 Thomas Boulevard • Pittsburgh 8, Pa.

Check 1810 opposite last page

Call Chromalox
for the man with the ELECTRICAL ANSWERS

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Trinity 5-7244

BALA-CYNWYD, PA.
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Uses: Temperature control of air or liquid.

Features: Once regulators are set within 10°F, vernier-like adjustments up to several degrees are easily made by turning one-inch-diam ring knob. Sensitivity is within ±0.005°C.

Description: Totally glass-enclosed needle-like tungsten contact is raised and lowered in mercury capillary by magnetic action. Capillary is hydrogen-filled under pressure to minimize arcing. Metal contact is sharply pointed.

Overall length of regulator is 14". Largest glass diameter is 9/16". Five inches of stem are submerged in liquid applications; entire stem in air applications. Temperature range is −35 to +400°F.

(Quick-set Thermo-regulators are product of H-B Instrument Company, Inc., American & Bristol Streets, Philadelphia 40, Pennsylvania.)

Check 1811 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

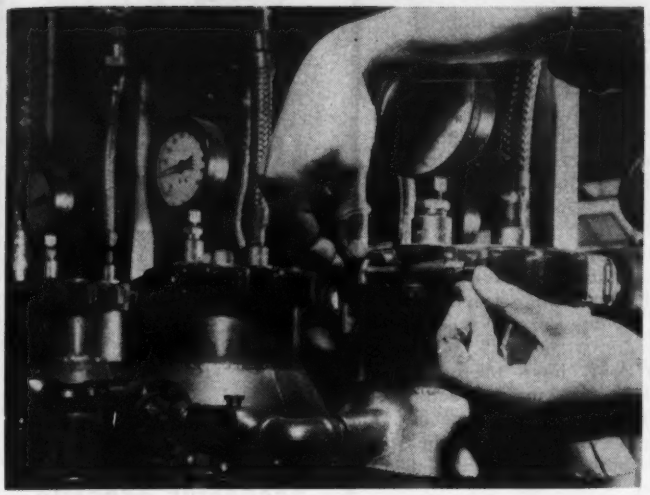
Spectrophotometers of ratio-recording type are described in 12-page brochure. In addition to performance and versatility features, bulletin lists specifications, operating convenience, application data, and accessories. Bul 735—Scientific and Process Instruments Division, Beckman Instruments, Inc., 2500 Fullerton Rd., Fullerton, Calif.

Check 1812 opposite last page.

Temperature monitoring is described in 30-page catalog. Details of operation, specifications, connections, installation, and other information are included. A section contains information on resistance temperature detectors. Cat 3036C—Instrument Division, Thomas A. Edison Industries, McGraw-Edison Company, West Orange, N.J.

Check 1813 opposite last page.

Pivoting T bolt of Inconel X alloy slips easily into place to fasten new 8"-diameter coupling. Another bolt is in rear



Technician with crescent wrench takes a few turns on front and rear bolts and coupling is ready for use

CP CORROSION CONTROL

Bi-metal Couplings Five Times Faster, Withstand Corrosion

In addition to cutting time to open and close pots, corrosion-resistant, economical couplings provide tight seal under pressure or vacuum

Problem: To find a quick-disconnect, dependable method for fastening 8"-diameter covers on experimental polymer pots at American Cyanamid Company's research center at Stamford, Conn. The coupling had to be: 1) strong enough to withstand 60 psi pressure and 30" vacuum in cycle, 2) designed for rapid assembly and disassembly, 3) able to endure the corrosive nature of certain experimental reaction systems.

Bolted flanges with eight nuts proved too time consuming. Another fastening of special design proved unsatisfactory after trial.

Solution: An unusual strap-type coupling of Inconel X® age-hardenable nickel-chromium alloy was installed. Coupling was developed originally for use in missiles and atomic energy installations.

Besides having high strength and corrosion resistance, Cyanamid found it met need for quick assembly and disassembly. Pressure and vacuum involved were well within the coupling's tested range of 600 psi and 0.8 microns.

Design of coupling is extremely simple. Each unit consists of two sectional, embossed bands of Inconel X alloy that are joined by two T bolts of the same material. The inside circumference of the band has two rows of curved fingers that press against the beveled edge of a special flange designed for use with the coupling. Inside each curved finger is a stainless steel insert.

Combination of Inconel X retaining fingers and the nickel-containing 316 stainless steel inserts behind them also gives the coupling special temperature-compensating characteristics, should the experimental pots be called upon to handle hot material. At elevated temperatures the stainless steel inserts, having a higher coefficient of expansion, respond to heat by forcing the coupling fingers tighter against the flange. The higher the temperature rises, the tighter the clamp becomes.

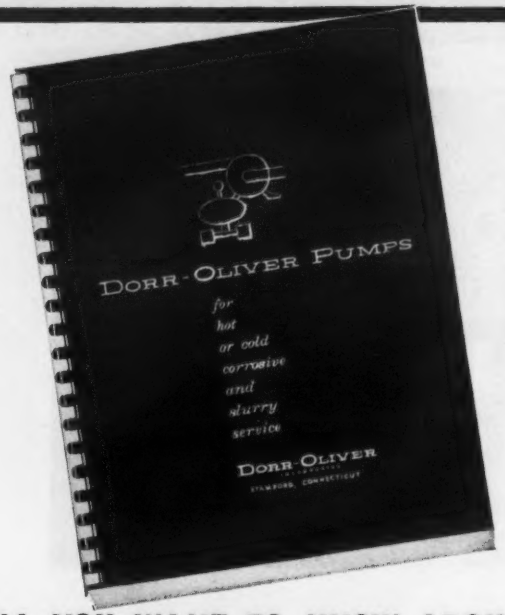
At lower temperatures, this feature also assures a tight joint since the fingers are seated in a depression in the band.

Coupling had been tested and used in several industries, other than defense, prior to the application at Cyanamid. Its light weight, high strength, corrosion resistance, temperature compensation, and quick-disconnect feature have found application in the petroleum, aviation, and petrochemical fields.

Tests and actual operating conditions have subjected the coupling to temperature extremes ranging from −320 to 1750°F, to pressures as high as 8000 psi, and vacuum as low as 0.8 microns. Materials handled include such difficult gases and liquids as helium, ethylene oxide (at 1750° F), liquid nitrogen, and liquid sodium.

To assemble the 8"-diameter coupling being used at American Cyanamid, a technician has three simple operations to perform. First he inserts an O-ring in the special groove in the pot flange. Next he positions the cover on the pot and places the coupling around the flange. Then he slips the two T bolts in place, drawing them up finger tight. Last step is taking up on bolts with an adjustable crescent wrench. To remove coupling the operation is simply reversed. Assembly and disas-

Closeup of coupling band interior shows Inconel X fingers and stainless steel inserts that grip flange



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Check 1814 opposite last page

sembly combined take approximately five minutes.

Results: For six months American Cyamid has been using the couplings in daily service during experiments on new Creslan® acrylonitrile-based fiber. To date the versatile couplings have met all demands upon them. The Inconel X outside band has been unaffected, as far as visual examination can determine, by the corrosive conditions.

Pot seals have been tight and leak-free under vacuum or pressure. They engage and disengage as easily and quickly as they did when first installed. Cost for the three couplings was less than for previous bolted flanges. Time to open and close pots has been reduced to approximately 1/5 the previous time.

(Inconel X alloy is product of The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.)

Check 1815 opposite last page.

(Temperature compensating coupling is product of the DSD Manufacturing Co., Inc., 2970 Whitney Ave., Hamden, Connecticut.)

Check 1816 opposite last page.

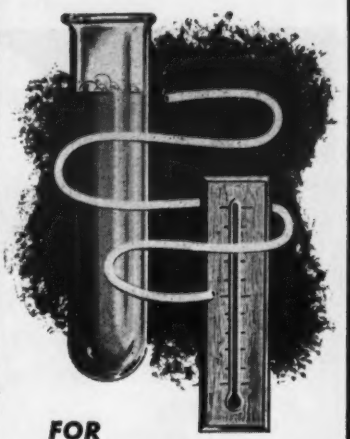
Fatty nitrogen derivatives effectively control H_2SO_4, HCl corrosion

Also widely used in oil systems as inhibitors

Recent technical paper tells how inhibitors based on fatty acid-derived nitrogen compounds have been developed and tested to combat specific corrosion conditions. Inhibitors for sulfuric acid, hydrochloric acid, and oil systems are discussed. These inhibitors include fatty amines, fatty quaternaries, and ethoxylated fatty nitrogen compounds.

Sulfuric Acid

Fifteen different fatty nitrogen derivatives were tested in 30% H_2SO_4 at 200°F by the coupon method. Excellent protection was obtained with a



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A unique combination of properties are available to you when you use PF flexible tubing made from Teflon*:

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These properties, plus our carefully controlled extrusion techniques, make PF's flexible tubing made from Teflon* ideally suited for chemical, pharmaceutical, petroleum, hydraulic hose and similar applications requiring unique tubing properties.

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Check 1817 opposite last page

Equipment used in oil-wetting test for preliminary screening of corrosion inhibitors for oil systems. Probe on left was non-oil wetted and corroded badly in a full-scale steam turbine oil test. Probe on right was completely oil-wetted, thereby preventing corrosion

low concentration of cocotrimethyl ammonium chloride. However, under these conditions a slight tendency toward pitting around the edges of coupon was noted.

A low concentration of a thiourea was blended with the quaternary to minimize corrosion. Pitting was thereby prevented and corrosion protection further improved through an apparent synergistic action. Good corrosion protection is shown up to a 70% acid concentration. At this point the corrosion rates were so low it was not possible to show appreciable improvement.

Quaternary-thiourea combination resulting from this work has been plant tested as an inhibitor in pickling low- and medium-carbon steels with excellent results. A concentration of 0.03% in a 7.5% H_2SO_4 bath at 175°F effectively protected the metal without retarding the pickling process. It also provided a satisfactory foam blanket.

Hydrochloric Acid

Inhibitor studies with fatty nitrogen derivatives indicated ethoxylated amines to be most effective of those tested. In order to achieve a still lower corrosion rate, propargyl alcohol was blended with fatty

A Y Globe that challenges comparison shows it pays to

Specify JENKINS for STAINLESS STEEL Valves, too

Want the "best buy" in Stainless Steel Y Globe Valves? Compare this Jenkins Fig. 1335 with any on the market. You'll conclude that it's hard to beat Jenkins at making valves, no matter what the material.

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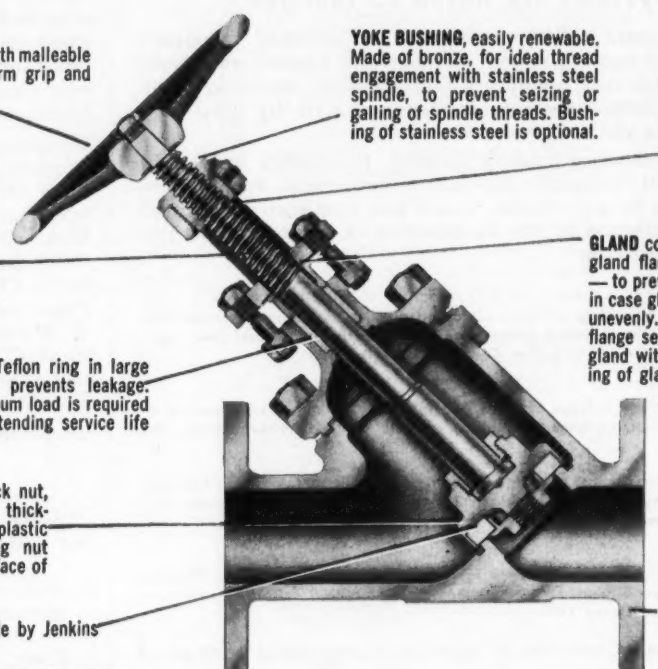
SEND FOR NEW CATALOG of Jenkins Stainless Steel Valves, in patterns and alloys that satisfy the requirements of practically all corrosive services.

These Jenkins Valves meet valve industry specifications and the high standards established by leading users of stainless steel valves.


WHEEL of high strength malleable iron designed for firm grip and easy operation.
YOKE BUSHING, easily renewable. Made of bronze, for ideal thread engagement with stainless steel spindle, to prevent seizing or galling of spindle threads. Bushing of stainless steel is optional.
YOKE BONNET, a single unit, has liberal space between yoke arms for easy access to packing box. Tongue and groove joint with body makes a pressure-tight seal with less tightening on the bolts, and eliminates possibility of blowing out the Teflon gasket.
SPINDLE of large diameter and dense structure has high resistance to wear and torsion strains. Easy, tight closing is assured by long, precision machined thread bearing surfaces. A beveled shoulder provides backseating against inside of bonnet, permitting repacking under pressure.
GLAND consists of two pieces — gland flange and gland follower — to prevent binding of follower in case gland bolts are tightened unevenly. Crowned surface of flange secures tightness against gland without excessive tightening of gland nuts.
PACKING A Teflon ring in large packing box prevents leakage. Only a minimum load is required on gland, extending service life of packing.
DISC HOLDER, held by lock nut, has depth equal to disc thickness, preventing flow of plastic disc. Wide disc retaining nut covers all but seating surface of Teflon disc.
DISC is Teflon made by Jenkins
BODY Through-port design for full, free flow. Liberal seat height permits repeated refacing. Cast on body are directional arrow and bosses for drain connections. End flanges conform to M.S.S. specifications.

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Check 1818 opposite last page

Reduce Maintenance Coating Costs–

Carboline Systems are Keyed To Your Job

Many maintenance paint dollars are wasted on so-called "cheaper" paints. Moreover, no **one** coating system can perform equally effectively under **all** conditions. Either way premature failures occur, requiring costly re-painting. You can substantially cut maintenance costs by specifying systems that are keyed to your requirements.

Four Carboline maintenance coating systems, thoroughly proven in service, are recommended for specific corrosive environments. Each system is "keyed" or tailor-made for a particular type of job. And each is designed to provide maximum protection for the longest time at the lowest cost per square foot per year of service.

CONDITION 1

Mild fumes, splash or spillage of most acids and alkalies. Continuous temperatures to 150°F. where maximum surface preparation is not practical. Structural steel, pipe, walls, equipment exteriors. **Carboline CS-200 (all vinyl) system.**

CONDITION 2

Severe fumes, splash or spillage of acids and alkalies. Continuous temperatures to 180°F. Structural steel, equipment exteriors, concrete walls. **Carboline Epoxy 188.**

CONDITION 3

Heavy duty protection against solvent, caustic and acid spillage. Continuous temperatures to 200°F. Structural steel, equipment exteriors, concrete. **Carbomastic #3 (epoxy tar) and Phenoline 305 topcoats.**

CONDITION 4

Economical, easily applied maintenance system for mild chemical fumes. Requires minimum surface preparation. Continuous temperatures to 200°F. Can be used over old paints. **Carboline Epoxy 110.**

Write for newly released Chart No. 5 showing comparative ratings of coating systems by physical and chemical properties — an engineering aid in choosing the most efficient protection. Also ask for technical data and recommendations on Carboline maintenance systems.

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Specialists in Corrosion Resisting Coatings and Linings

Check 1819 opposite last page

nitrogen chemicals.

Tests conducted with this combination gave good results, even with ferric chloride being present in the bath. In addition to mild steel, inhibitor protected Monel, brass, copper, bronze, 316 stainless.

Field tests have substantiated laboratory studies. Concentration of 0.1 to 0.25% of the inhibitor in 5 to 15% HCl used for plant cleanup gave satisfactory protection and did not interfere with cleaning operation.

Experience has shown that a good protection is given in oil systems only when the inhibitor causes the metal surface to be oil wetted. Tests developed to indicate the degree of oil wetting showed fatty diamines to be satisfactory in this respect. Diamines and salts such as oleates and naphthenates are highly successful in controlling corrosion due to oxygen, hydrogen sulfide, carbon dioxide, and organic acids in oil systems. In lubricants, these inhibitors not only control corrosion but also improve lubrication.

(Condensed from technical paper, "Corrosion Control with Fatty Nitrogen Derivatives," which was presented at the National Association of Corrosion Engineers Annual Meeting in Chicago in March 1959. Paper was prepared by Byron E. Marsh, Research Department, Chemical Division, Armour and Company, 1355 West 31st Street, Chicago 9, Ill.)

Check 1820 opposite last page.

Variety of plastics used for resistant valves

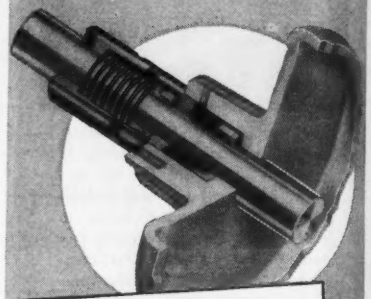
Non-rotating stem design eliminates galling

Uses: With high vacuum; also in process control lines, instrument air lines, and corrosive conditions requiring plastic materials.

Features: Available in variety of corrosion-resistant plastics, valves have non-rotating stem which eliminates galling between stem and valve seat.

Description: Valves are available in polyethylene, Zy-

MOUNTING GLAND *Eliminated* ON CHEMPRO "Wedge-Lock" mechanical seals



The Chempro line of external "wedge-lock" seals does not require a mounting gland, or any modification to the stuffing box, to align and hold the Chempro seal in position. The patented "wedge-lock" design automatically seats the seal stator in the stuffing box in perfect face-to-face alignment with the seal rotor on the shaft. Simple and easy to install—*in only 20-30 minutes.*

OTHER ADVANTAGES

- Completely Interchangeable with Packing
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*du Pont trademark

Write for Bulletins CP551 and 575

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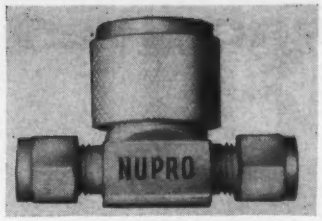
Check 1821 opposite last page



Nupro plastic high-vacuum valve has non-rotating stem

tel, Teflon, Plaskon, and other plastics. They are available with Swagelok or pipe-thread ends.

(Nupro plastic high-vacuum valves are a product of Nuclear Products Co., Cleveland 10, Ohio.)

Check 1822 opposite last page.

Teflon gasket is resistant to chemicals and heat

Uses: Applications in stainless-steel fittings, unions, and flanged joints.

Features: Teflon gaskets are inert to practically all chemicals used in industry and remain stable over wide temperature range.

Description: Gaskets are available in full range of sizes. They will not absorb moisture. Low friction coefficient assists flow and wax-like surface remains always clean.

(Teflon gaskets are product of Amasco Products, 79-22 71st Ave., Brooklyn 27, N. Y.)

Check 1823 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Stainless steel valves with replaceable Teflon discs or seats are described and illustrated in bulletin. Bul 11 — Alloy Steel Products Company, Inc., Linden, N.J.

Check 1824 opposite last page.

NEW Allflex VIBRATION TAMERS

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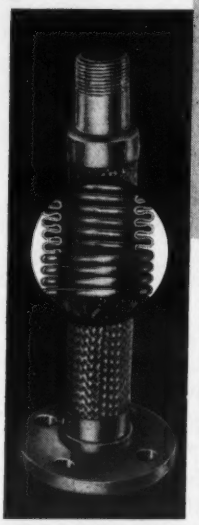

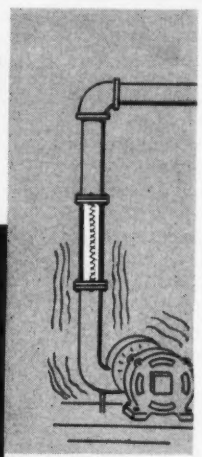

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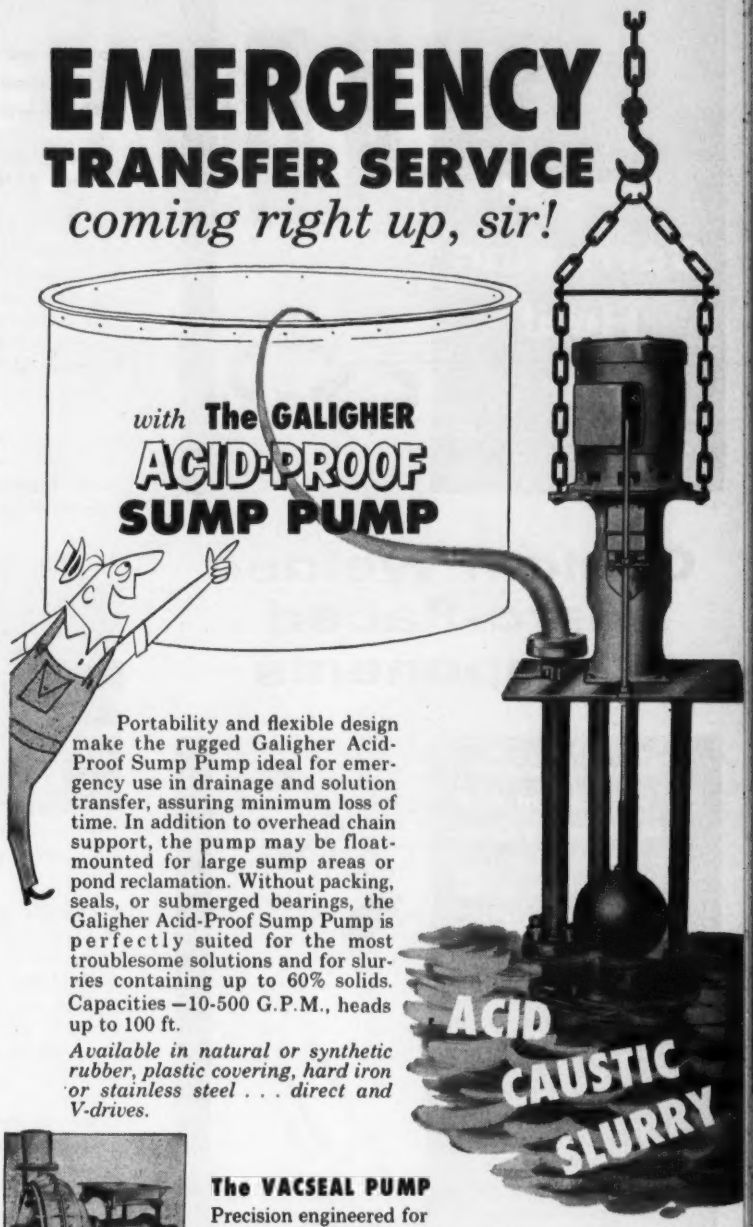

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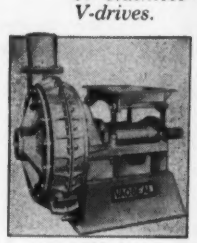

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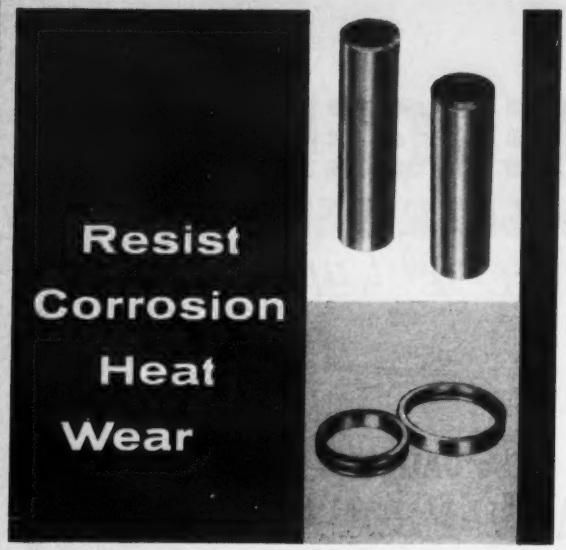
GALIGHER PRODUCTS: AGITAIR® Flotation Machine, VACSEAL Pump, Geary-Jennings Sampler, Acid-proof Sump Pump, Geary Reagent Feeder, Laboratory AGITAIR® Flotation Machine, Laboratory Pressure Filter, Laboratory Ball Mill, Rubber Lined and Covered Products, Plastic Fabrication. SP. 504

Check 1826 opposite last page



Custom Welded Hard-Faced Components

. . . Reduce Downtime, Replacement And Maintenance Costs
As recognized specialists in the applications of super alloys to critical areas of stainless steel and ferrous metal parts, Cleveland Hard Facing, Inc., is your dependable source for components that offer: . . . high compressive strength up to 250,000 psi and good flat impact and high hot strength. . . . excellent resistance to many corrosive acids, alkalies or oxidizing materials . . . inherent resistance to wear, erosion, abrasion and cavitation. Send in your blue print for our quotation or recommendations on your application.
Send for complete details on how this unique process can add greater service life to your equipment.
HF
Cleveland Hard Facing, Inc.
3047 STILLSON AVENUE · CLEVELAND 15, OHIO

Check 1827 opposite last page

CORROSION CONTROL

Hose handles 98% H_2SO_4 for 18-month period without wear

Suction-or-discharge hose is made of Hypalon

Hypalon suction hose shows no signs of wear after 18-month service period conducting 98% sulfuric acid from tank trucks to storage tanks at Arnold, Hoffman Company, Dighton, Massachusetts.

Hose has applications in suction (up to full vacuum) and/or discharge (50 to 150 psi) service. It can handle many highly corrosive materials such as sulfuric, chromic,

Hypalon hose can handle many highly corrosive materials

nitric, and glacial-acetic acids. It also is suitable for service with sodium dichromate and sodium hypochlorite.

Hose is reinforced by wrapped construction and wire. Breaker fabric increases adhesion between tube and carcass to prevent tube collapse under high vacuum. Coated steel wire is wound in continuous spiral. Tube to prevent fabric from acid penetration is available in either 3/16- or ⅛" thickness.

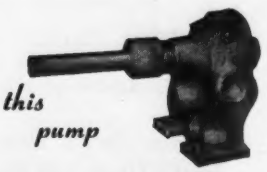
(Commander acid suction hose is product of B. F. Goodrich Industrial Products Company, Division of The B. F. Goodrich Company, Marietta, Ohio.)

Check 1828 opposite last page.

Vinyl coatings and how they can be successfully applied over phenolic primers are explained in five-page publication. Bul 38—Union Carbide Plastics Co., Div. of Union Carbide Corp., 30 East 42nd St., New York, N. Y.

Check 1829 opposite last page.

Pump CORROSIVES



with this pump of

STAINLESS STEEL *and* TEFLON

(Dupont's trademark for fluorocarbon resins, including tetrafluoroethylene resin).

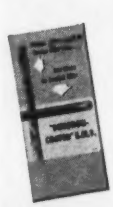
Being used successfully by leading chemical companies. Write for literature.

LOBEE PUMP & MACHINERY CO.,
GASPORT, N.Y.
Since 1899 . . . Noted for Highest Quality Gear Pumps

Check 1830 opposite last page

Republic ELECTRUNITE "Dekoron-Coated"

E.M.T. resists corrosion after years of service

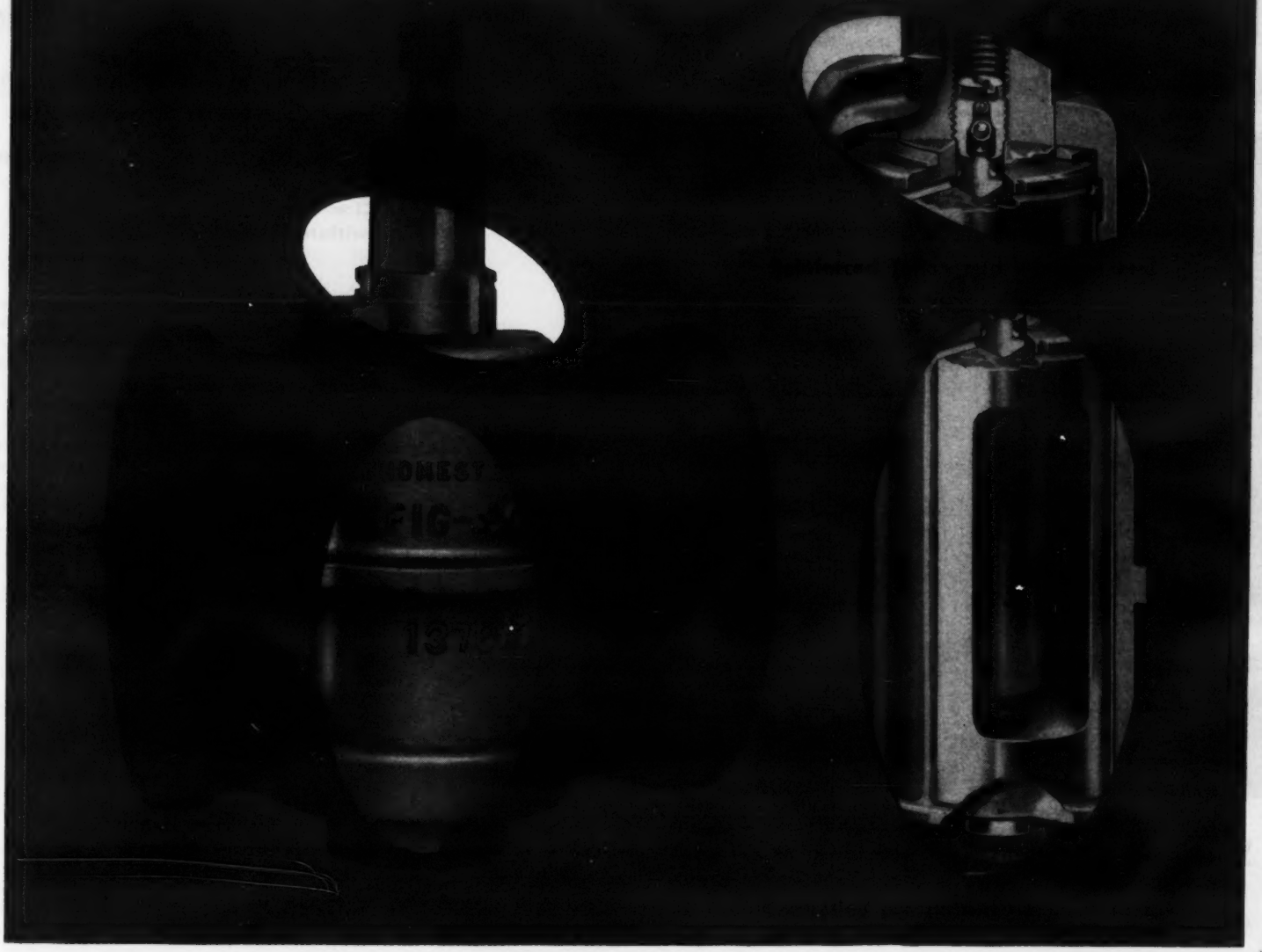


Republic ELECTRUNITE® "Dekoron®-Coated" E.M.T. stopped costly corrosion at Southland Paper Mills, Lufkin, Texas. Previously, standard conduit had to be replaced at frequent intervals in certain locations exposed to steam, moisture, and chemical fumes. After three years of service, Republic's extra tough "Dekoron-Coated" E.M.T. is still in excellent condition, and gives promise of continued years of service. See your electrical distributor or write for FREE folder DEK-3.

REPUBLIC STEEL
STEEL AND TUBES DIVISION
2071 East 131st Street · Cleveland 8, Ohio

Check 1831 opposite last page

LEAKPROOF



Lower cost per year valve service is guaranteed by Homestead Lubricated Plug Valves. These are the features that make them leakproof and extend their useful life . . . reinforced Teflon* head seal, double ball and lubricant sealed check valve, and their exclusive controlled pressurized lubricant seal.

Homestead's controlled lubricating system forces a chemical film over all sealing surfaces at more than 300 pounds pressure. In addition, it prevents sticking, by its piston-like movement of the plug during each lubrication. See how Homestead fills your valve needs. Write today for Reference Book 39, (Section 5), for complete information on Homestead Lubricated Plug Valves.

*DuPont registered trademark.

HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. Box 140 Coraopolis, Pa.

Check 1832 opposite last page

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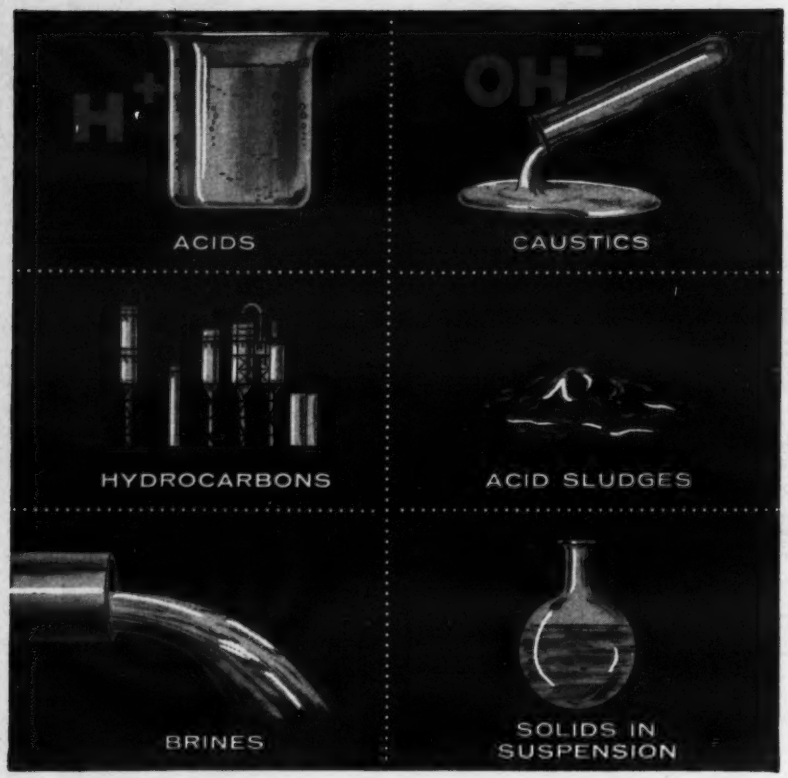
COPE WITH THESE CONDITIONS

to keep on stream?



you combat them all with an

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What can a copper-base alloy do for you? Whatever it is, there's a grade of Ampco Metal — or other Ampco alloy — that does the job exactly.

Equally important, you can select the best, most economical form of production — fabrication, sheet, plate, tubing, pipe and fittings, extrusion, forging, sand casting, centrifugal casting.

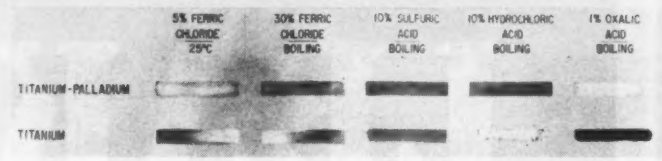
Call in your Ampco field engineer.

G-22

AMPCO METAL, INC., Dept. 130E, Milwaukee 46, Wis.
WEST COAST PLANT: BURBANK, CALIFORNIA • SOUTHWEST PLANT: GARLAND (DALLAS COUNTY), TEXAS

Check 1833 opposite last page

Fig 1 — Coupons of various corrosion-resistant metals which have undergone testing in hot or boiling acids



Titanium-Palladium Alloy Has Broad Corrosion Resistance

Addition of 0.1% or less of noble metal to titanium makes it resistant to reducing solutions such as HCl without lessening metal's ability to withstand oxidizing agents

Although titanium is an outstanding performer for oxidizing media such as nitric acid or ferric chloride, it has not been suitable for reducing media. Now it has been found that addition of a small amount of palladium or any one of several other noble metals gives titanium resistance to reducing solutions also. See Fig 1.

For example, in a boiling 5% solution of hydrochloric acid, titanium dissolves at a rate of more than one inch per year. Titanium containing 0.1% palladium decreases this corrosive attack to less than 0.01 inches per year.

Many acids in chemical processing operations are not pure or consist of mixtures. Conditions may change from oxidizing to reducing. Titanium-palladium alloy would meet such conditions satisfactorily. Hence, the alloy is suitable for a wider range of conditions. Addition of the noble metal to titanium does not make titanium any less resistant to oxidizing solutions.

Accompanying Fig 2 shows how range of corrosive conditions titanium will handle has been broadened by the addition of a noble metal. Total area shown represents a variety of different types of corrosive environments. Vertical line in center separates oxidizing environments on left from reducing environments on right.

In addition, as one moves further and further to the left or to the right on Fig 2, environment becomes more oxidizing or reducing and more

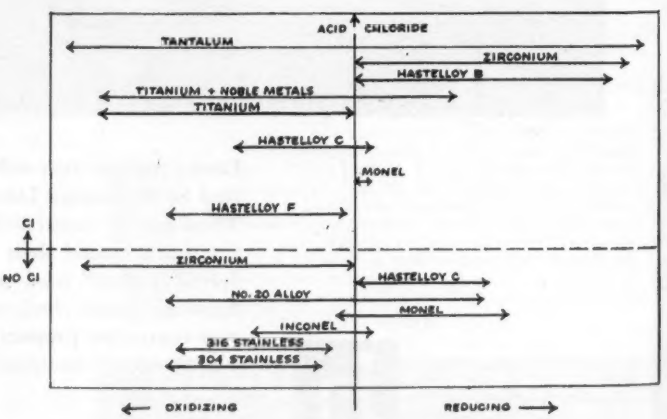


Fig 2 — Comparison of titanium and titanium-noble metal alloys with other corrosion-resistant materials

aggressive. For example, this represents an increase in temperature and concentration. Also, moving from bottom to top, the environments show greater tendency to break down passivity illustrated by an increase in acid-chloride content. Solid lines with arrows at the end show the behavior of particular alloys. Each alloy will handle all environments below its solid line.

Mechanical properties of pure titanium alloy are not impaired in any way by the addition of a noble metal.

In developing the alloy it was found that the improvement could be made with any one of several noble metals — platinum, palladium, rhenium, ruthenium, iridium, osmium, or rhodium. Since palladium is lower in price than the others, economics suggest it be the one to use.

At present prices, 0.1% palladium adds about 28c per pound to price of titanium — not a large addition for titanium mill products running $4 to $14 per lb. Discovery should increase use of titanium in chemical processing equipment.

(Titanium-palladium alloy is development of Union Carbide Metals Company, Div. of Union Carbide Corp., 30 E. 42nd St., New York 17, N.Y.)

Check 1834 opposite last page.

Pushbutton remote control with air-actuated valves

Uses: On liquid-conveying lines.

Features: Valves may be either locally controlled or pushbutton-remote controlled from any plant area.

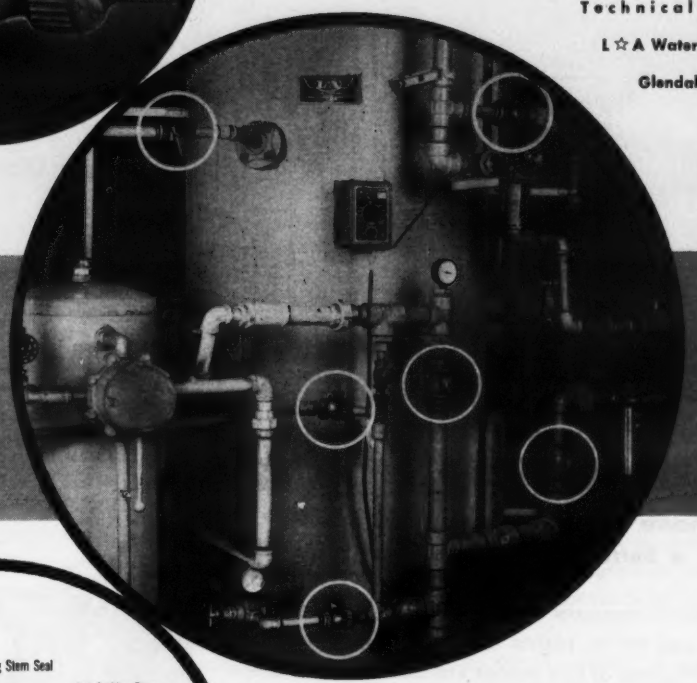
Description: Air-actuated valves are manufactured from 304 stainless steel. Corrosion-resistant valves are available either in direct- or reverse-acting styles in both single- and double-position types. Manually operated types are available.

(Air-actuated valves are product of Tri-Clover Div., Ladish Co., Kenosha, Wis.)

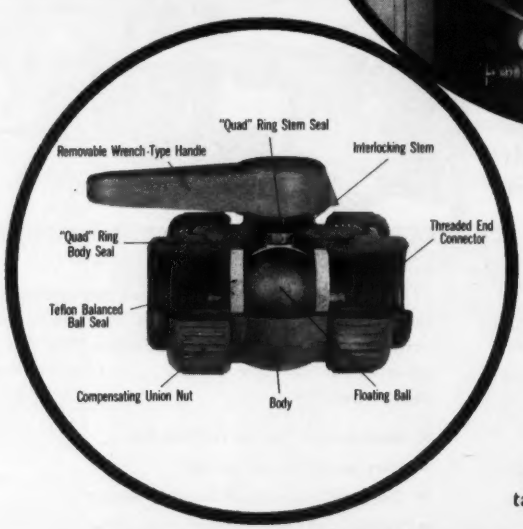
Check 1835 opposite last page.

"CHEMTROL *Plastic Ball Valves assure controlled flow of corrosive chemicals in our deionizing systems--"*

says Eugene Schmidt, Technical Director, L☆A Water Softener Co., Glendale, California.



CHEMTROL plastic ball valves, part of original equipment, on deionizing system at Pioneer Electronics, Los Angeles. Firm rebuilds TV picture tubes. Water purity is essential in preventing screen discoloration.



CHEMTROL PVC BALL VALVES used by L☆A Water Softener Co. are exposed to corrosive effects of sulfuric acid (10%), and caustic soda (4% to 50%). Pressures attain 125 psi. Quick disassembly allows speedy line service in event of obstructions.

OTHER FEATURES: handle indicates valve position from distance — positive shut-off with quarter-turn action. Teflon seats are adjustable, non-sticking. Ball construction assures long life, full flow, non-turbulence. Compact design permits easy adaptation to existing or proposed piping systems.

chemtrol ®

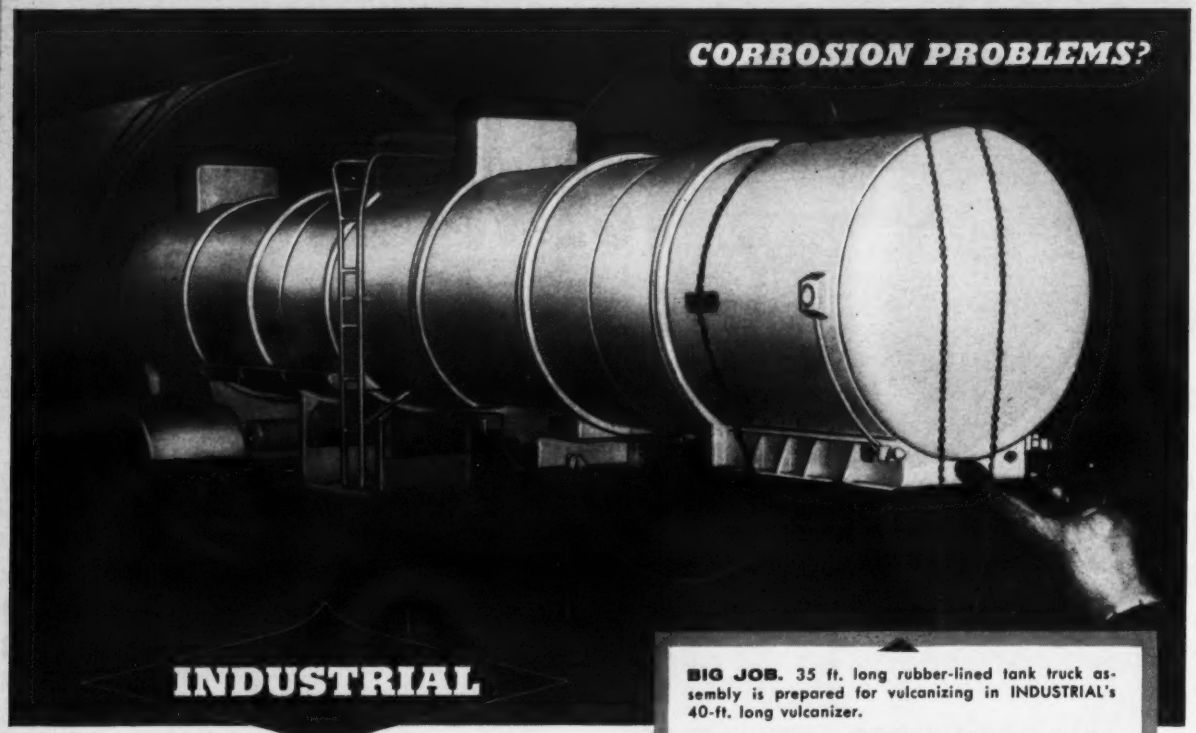
Distributor stocks nationally

CHEMTROL
10872 Stanford Ave.
Lynwood, California
NEVADA, 60837

*CHEMTROL manufactures plastic piping systems equipment for corrosion service. Our complete family of plastic valves includes BALL VALVES, CHECK VALVES, COCK VALVES, METERING NEEDLE and GLOBE VALVES, made from a wide range of plastic materials: PVC types I and II, Kralastic,** Polypropylene, and Penton.* If you are an engineer designing plastic piping systems, send for our new handbook #159.*

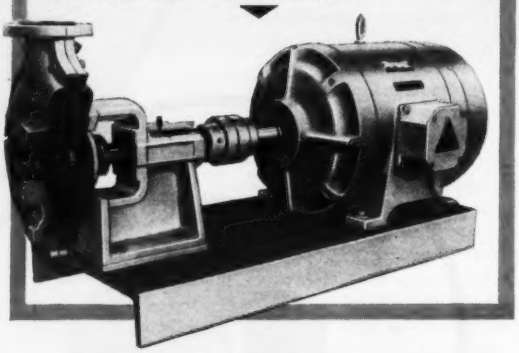
**Hercules Powder Co. **Naugatuck Chemical Co.*

Check 1836 opposite last page



BIG JOB. 35 ft. long rubber-lined tank truck assembly is prepared for vulcanizing in INDUSTRIAL's 40-ft. long vulcanizer.

SMALL JOB. INDUSTRIAL rubber-lined Centrifugal Pumps give long life with minimum maintenance on the most severe corrosion service.



For Skilled Rubber Surfacing

. . . these complete facilities insure a *better* job at *lower* cost

INDUSTRIAL operates one of the largest rubber compounding and lining plants outside of the rubber industry. Here, tons of raw rubber are maintained in stock for formulating and compounding into compression molds and rubber linings to meet the *most specific* corrosion or abrasion-resistant services.

This extensive facility permits INDUSTRIAL to maintain the highest standards of quality control for rubber-lined processing equipment designed and built by INDUSTRIAL. In addition, it also provides a skilled, experienced and well-equipped source for *custom* sheet lining and compression molding to meet individual requirements.

All the benefits of INDUSTRIAL'S experience in designing, engineering and producing rubber components, and for applying it to the most intricate surfaces, is described in our RUBBER DIVISION bulletin. Write for your copy, today.

INDUSTRIAL Centrifugal Pumps are specifically designed for rubber lining. **As a result, they characteristically provide long, trouble-free life in corrosive or abrasive service . . . offering these design benefits:**

- **Mechanical Seal or stuffing box**
- **Easy access to pump seal**
- **Quick adjustment of impeller clearance**
- **Teflon seal cage (stuffing box only)**
- **Impeller insert welded to shaft**
- **One-piece, maintenance-free rotating element**

INDUSTRIAL FILTER & PUMP MFG. CO.
5908 Ogden Avenue,
Cicero 50, Illinois

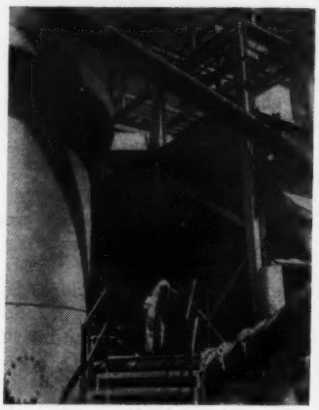
C-159

Check 1837 opposite last page

Phenolic-based paint resists corrosion for three years

Paints based on phenolic resins have resisted corrosion for three years at Virginia-Carolina Chemical Corporation's Clear Springs plant in Florida. In addition to resisting corrosion fumes and fading by sun, coating has withstood slurry spillage.

Paint was applied by spray and formulated in off-gray color to match possible spillage of corrosive slurries. Equipment is not expected to need recoating for at least 1½ years. Use of coating has kept costs at minimum and eliminated necessity of closing down for repainting.



Section of Virginia-Carolina Chemical's plant coated with phenolic-based, corrosion-resistant paint

(Bakelite brand phenolic resins are product of Union Carbide Plastics Company, Division of Union Carbide Corporation, 30 E. 42nd Street, New York 17, N.Y.)

Check 1838 opposite last page.

Nickel alloy coating prevents corrosion of pump shafts

Recent tests show that a chemically deposited coating consisting of 93% nickel and 7% phosphorous is effective in protecting pump shafts from corrosion. In the test, coating

To page 163

"SPECIAL" Welding Fittings

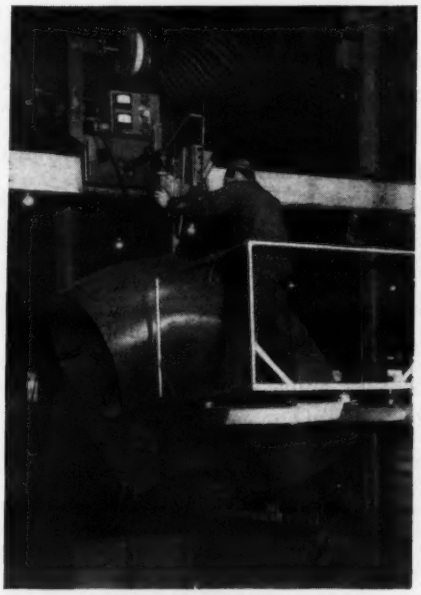
by MIDWEST

"SPECIAL" DESIGNS
"SPECIAL" MATERIALS
"SPECIAL" QUALITY
"SPECIAL" DELIVERY

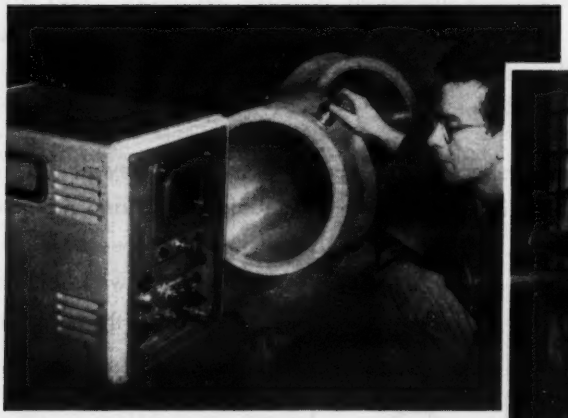
Special gauges and instruments are used to make sure that we have complied with the extremely close tolerances often required on stainless fittings. Here wall thickness and concentricity were held within extremely close limits throughout the fittings.

The exclusive Midwest method of manufacture—much more versatile and flexible than any other—enables us to make almost any type of special welding fittings to the most rigid specifications. Midwest makes welding fittings from *plate* . . . usually much easier to get than pipe, particularly if the material is special. That expedites delivery. Closer tolerances are inherent in the Midwest process, and quality control is always beyond code requirements.

Even if you use only standard fittings, the exceptional quality of Midwest fittings can be important to you. Ask your Midwest distributor or write us for new Bulletin 5801.



36" O.D. 90° elbow with 16" tangent on one end being welded by an automatic submerged arc machine. Material is A-201 carbon steel.



Stainless-clad elbows undergoing ultrasonic inspection to check bonding of material and quality of weld. Since plate is often the only form in which clad material is available, the Midwest process is able to produce the most comprehensive range of clad fittings—and to do so promptly.

Special 24" x 21" 45° reducing elbow made of 1" thick 1¼% chrome ½% moly steel ready for heat treating furnace.

MIDWEST PIPING COMPANY, INC.

Main Office: St. Louis 3, Mo. (P.O. Box 433)
PLANTS: ST. LOUIS, CLIFTON, N. J. and LOS ANGELES

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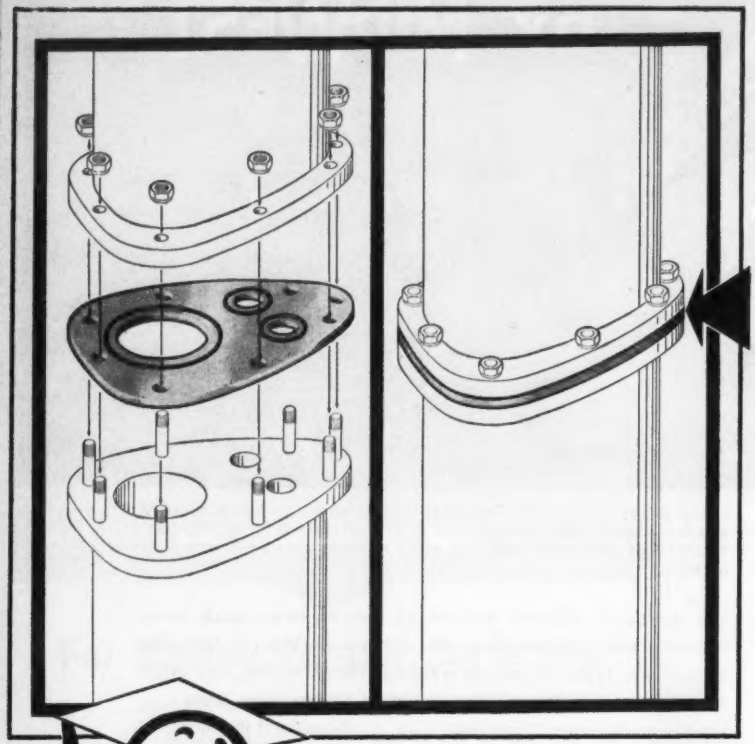
Check 1839 opposite last page

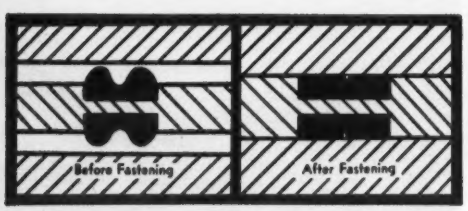
DO YOU KNOW ABOUT GASK-O-SEALS?



You Can't leave a Gask-O-Seal® out!

Hundreds of accidents have been caused by seals being left out during assembly or repair, and thousands of production hours have also been lost for the same reason. Just one of the plus values of Gask-O-Seals is that they are practically impossible to leave out because they are inspectable visually after assembly. This can mean many valuable warranty dollars saved, many hours of downtime saved — and it may mean the saving of human lives.

They also provide no-leakage positive sealing, prevent blow-outs. Damaging coldflow is eliminated, high manufacturing and maintenance machining costs are avoided and they are reuseable. If you use static seals in your designs, why not find out about Gask-O-Seals — made by the makers of Parker O-rings.



Parker SEAL COMPANY
CULVER CITY, CALIFORNIA and CLEVELAND, OHIO
A DIVISION OF PARKER-HANNIFIN CORPORATION

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Do you know that the magazine can come to you personally without charge, to your designated address?

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would like to receive it and if you qualify, the publisher will add your name to the more than 50,000 key men in the chemical processing industries who receive each issue regularly.

The necessary qualifications are outlined on the request form that can be found opposite the inside back cover.

Fill it out, being sure to give all necessary information, and mail to Reader Service Department.

Perhaps . . .

others in your company would also like to receive CHEMICAL PROCESSING personally each month. Include their names on the form opposite the back cover.

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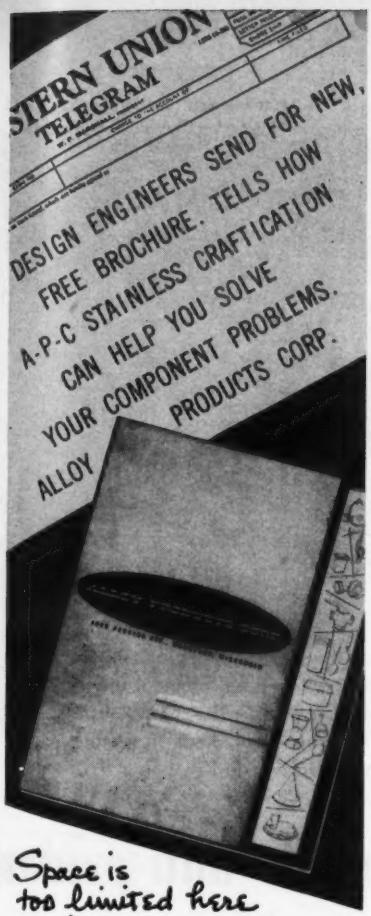
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TELEGRAM
DESIGN ENGINEERS SEND FOR NEW, FREE BROCHURE. TELLS HOW A-P-C STAINLESS CRAFTICATION CAN HELP YOU SOLVE YOUR COMPONENT PROBLEMS.
ALLOY PRODUCTS CORP.

Space is too limited here to give you even a vague idea of the facilities A.P.C can put at your command. Send a postcard or this coupon for a 20 page illustrated brochure telling the story...

Name

Title

Company

Street

City

State

ALLOY PRODUCTS CORP.

1075 Perkins Avenue
Waukesha, Wisconsin

Check 1841 opposite last page

From page 160

was applied to a depth of 0.001" over entire shaft with exception of threaded end.

The pump was then operated for a total period of 250 hours at 1900 rpm and 550 gpm, handling motor gasoline with a specific gravity of 0.756. After remaining idle for seven days while filled with same fuel, pump was placed in operation for 900 more hours under same conditions.

Inspection of the shaft revealed no signs of corrosion or cracks. Wear where pump bushings and gland bushings came in contact with shaft was normal.

From this test it was concluded that the chemically deposited nickel coating will reduce the requirement for costly and sometimes critical materials without sacrificing the corrosion-resisting and wearing qualities ordinarily available only in hardened stainless steel.

(Kanigen® nickel alloy coating process is development of Kanigen Div., General American Transportation Corporation, 135 South LaSalle Street, Chicago 90, Illinois.)

Check 1842 opposite last page.

PVC centrifugal pump now available

Line of centrifugal pumps is announced in which all parts are made of unplasticized polyvinyl chloride. This gives units broad chemical resistance. Elimination of possible contamination of solution is achieved.

Pumps are furnished in four sizes with 10 to 180 gpm capacity with discharge leads to 100'. Solution temperatures to 140°F can be handled.

PVC casing is supported by a rigid cast iron frame. Mechanical shaft seals are utilized. Rings are furnished of Teflon, carbon, ceramic and Stellite. Shaft is stainless steel.

(PVC centrifugal pump is product of Vanton Pump & Equipment Corp., Div. of Cooper Alloy Corp., Hillside, New Jersey.)

Check 1843 opposite last page.

Shown here are 33 of the 42 tank cars which will be lined in a single month by Lithcote. These cars, however, represent only a part of Lithcote's monthly protective coating application.

HERE'S HOW LITHCOTE CUTS THE HIGH COST OF CORROSION CONTROL

Lithcote Corporation is a corrosion and contamination control *specialist* . . . a pioneer in the manufacture *and* application of internal and external protective coatings for equipment of all kinds.

Only durable, proved baked-on linings and coatings are applied by Lithcote Corporation—our own time-tested Lithcote line as well as the best of the many other recognized name brands. Furthermore, with our new oven equipment, sprayed Plastisol (PVC) materials may now be applied to *any piece of equipment which can be* transported by truck or rail. Plastisols provide for the resistance of sheet rubber *without seams*, in thicknesses up to ⅛".

Lithcote is also your dependable source for:

AMERCOAT, BISONITE, COLUMBIA #7, COPON, UNICHROME

PARTIAL LIST OF EQUIPMENT COATED OR LINED BY LITHCOTE

PROCESSING
STORAGE TANKS
TANK CARS
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LIQUID SUGAR TANKS
TRAYS
DRYING EQUIPMENT
CHEESE VATS
MILK STORAGE TANKS
WHEY TANKS
CARBONATED BEVERAGE EQUIPMENT
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TRANSPORTATION
The many products transported in Lithcote lined tank cars and trucks include:
LATEX
FORMALDEHYDE
ACETALDEHYDE
INVERT SUGAR
EDIBLE OILS
VINEGAR
TALL OIL
CAUSTIC SODA
CARBON BISULPHIDE
PLASTICIZERS
EMULSIONS
CARBON TETRACHLORIDE
GLYCERINE
ALCOHOLS
WINES
CORN SYRUP
FATTY ACIDS
TRANSFORMER OIL
ACETIC ANHYDRIDE
SULPHURIC ACID
LARD
LACQUERS
PHENOL
TRIETHANOLAMINE

CHEMICAL AND PHARMACEUTICAL
STORAGE, MEASURING, FERMENTING AND MIXING TANKS
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TRUCK TANKS
RAILWAY TANK CARS VALVES
TROUGHS, HOPPERS AND CONVEYORS

PULP AND PAPER
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The same Lithcote experience in corrosion control is available to the Petroleum Industry for the internal and external coating of pipe and other equipment.

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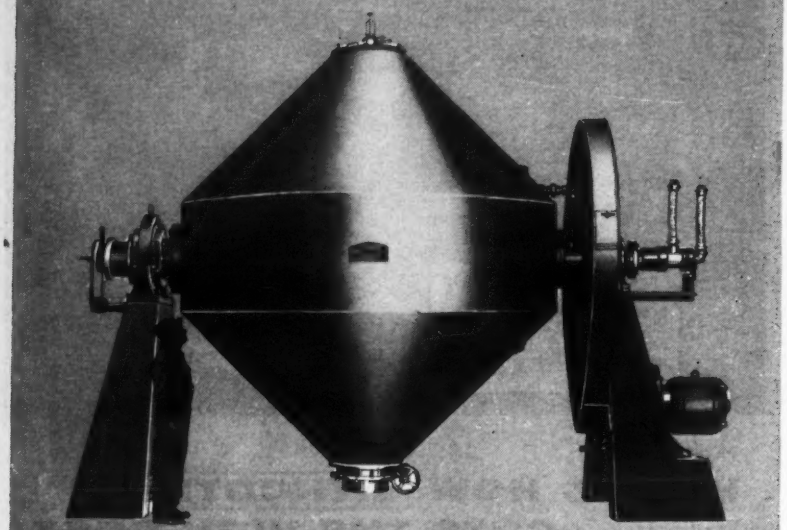
FOR QUICK, SAFE DRYING of DELICATE MATERIALS



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The gentle tumbling action of the Paul O. Abbé Rota-Cone Vacuum Dryer assures quick, even and complete drying.

So gentle is the action that it will not degrade even the most delicate material. Yet, the entire load keeps constantly in motion to assure uniform drying.

The Rota-Cone Vacuum Dryer is easy to clean since it has no internal agitators or baffles.

Why tolerate degradation of material, difficult cleaning, or uneven drying? Use a Paul O. Abbé Rota-Cone Dryer.

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PEBBLE MILLS · STEEL BALL MILLS · JAR MILLS · JAR ROLLING MILLS
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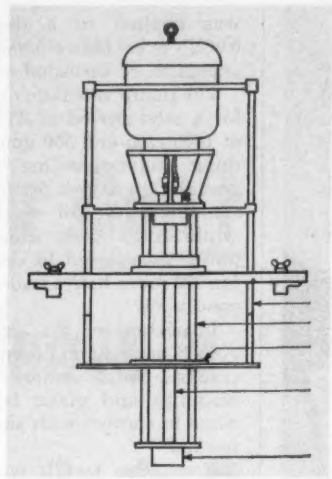
Check 1845 opposite last page



Homo-mixer prepares 200 gal batch of anti-oxidant in synthetic rubber plant

Mixing head is connected to motor by connecting shaft assembly consisting of rigid guide rods and coupling shaft

Mixing thick, viscous emulsions can present quite a problem — especially if air entrainment has to be kept to a minimum. Goodyear Tire and Rubber, using efficient, vortex-free mixer, finds that unit does job swiftly and uniformly and . . .

Speeds anti-oxidant in latex plant

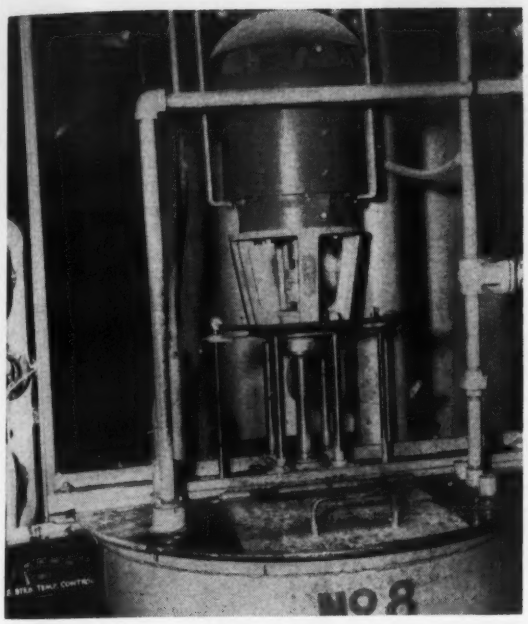
Problem: A fast and efficient method of mixing anti-oxidants for use in Chemigum synthetic latex rubber was sought by Goodyear Tire and Rubber Company at their Akron, Ohio, plant. The anti-oxidants are high-viscosity emulsions that must be added to prevent the latex from breaking down through combination with oxygen or oxygen compounds.

Because the anti-oxidants are highly viscous, complete and thorough blending is difficult. Unless thoroughly divided into each other, the final emulsion will show variation in quality. It is also important that no air be entrained in the batch during the mixing operation, since any entrapped air will affect finished product.

Chemigum is Goodyear's exclusive nitrile-type synthetic rubber which is resistant to oil and oil-base derivatives. Raw latex is produced by copolymerization of two primary raw materials, butadiene and acrylonitrile. Reaction takes place under controlled temperature and pressure. The homogenized anti-oxidants are added to the latex after polymerization.

Solution: After studying and trying various types of mixing devices, engineers installed an Eppenbach homo-mixer. A top-entering unit, it was fitted with a flanged "bridge" support which was welded to the 200-gal mixing kettle's cover plate.

Unit's mixing head is connected to a 10 hp motor by a connecting shaft assembly consisting of rigid guide rods and coupling shaft. A precision turbine-stator assembly located within the head performs the actual work of mix-



blending

ing, pumping, and shearing.

Turbine, rotating at 3500 rpm, acts as pump, drawing material from bottom of kettle. As product passes through turbine-stator housing, it is forced through restricted openings which exert intense forces of impact and hydraulic shear. This reduces material to uniform, fine particle size.

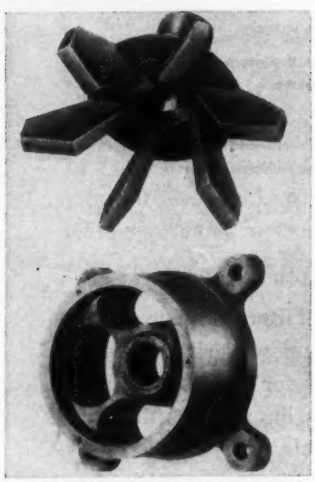
Discharged through top of head, product is deflected up and outward by a baffle plate. This sets up circular movement which forces unmixed material downward back into mixing zone. Air entrainment is avoided because, at all times, product is drawn from bottom of tank. There is no vortex effect.

Results: Anti-oxidants are blended and homogenized swiftly and uniformly. Conducted at medium temperatures, a 200 gal batch takes only about 15-20 minutes.

Though used in only one phase of the latex production process, the homo-mixer is considered essential to the overall production process. Hydraulic shearing brings about desirable changes in the product. Reduction to fine particles gives emulsion increased stability, resulting in better end product.

(Eppenbach homo-mixers are product of Gifford-Wood Co., Hudson, New York.)

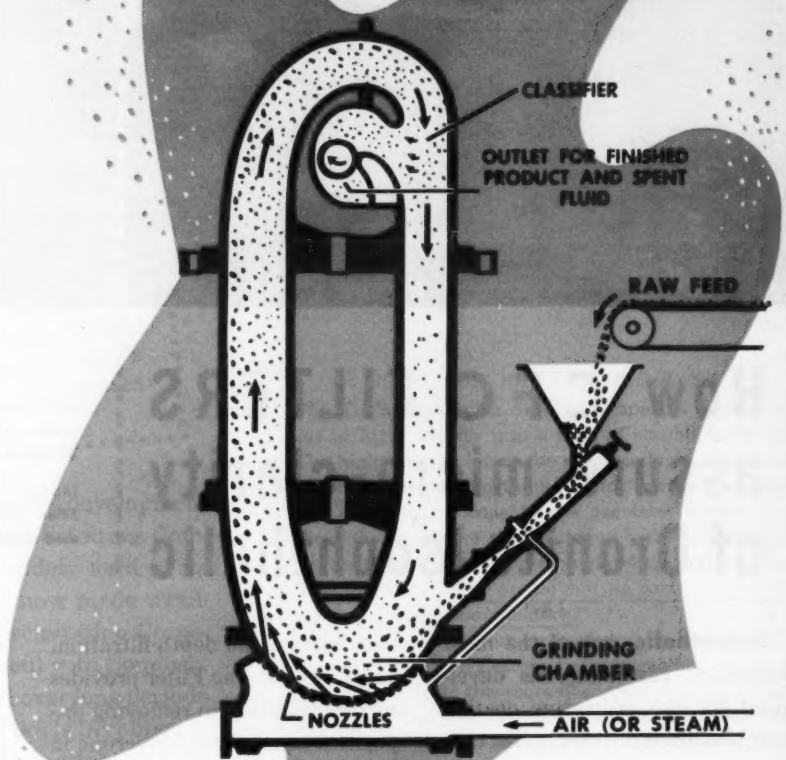
Check 1846 opposite last page.



Mixing head consists of turbine (top) and stator (bottom). When assembled, head mixes, pumps, and reduces products to fine particle size

for GRINDING AND DEHYDRATION
FINER PARTICLES
LOW MAINTENANCE

FLUID ENERGY JET-O-MIZER MILLS



The Fluid Energy "Jet-O-Mizer" Mill, designed and built by the pioneers in fluid energy fine grinding, does far more than produce fine particles. It controls fineness and product quality with a narrow distribution range and simultaneously with grinding can dehydrate, coat particles, blend and achieve chemical changes.

Jet-O-Mizer Mills are being used all over the world, processing many types of materials in the following industries:

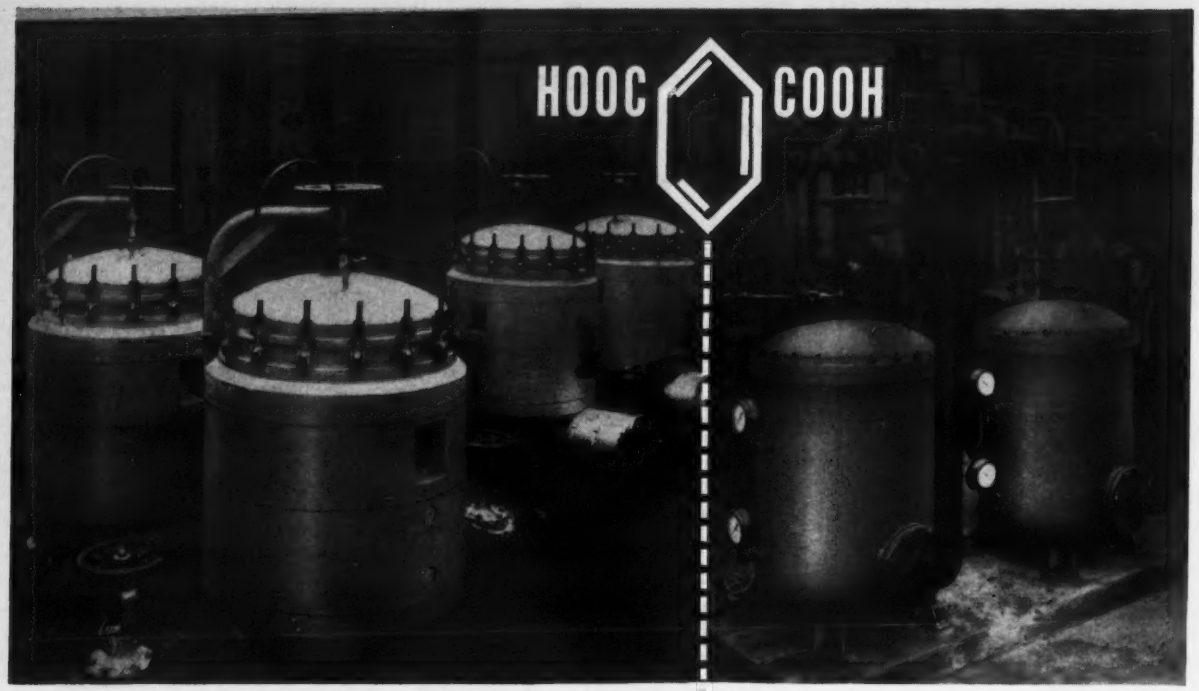
• Abrasive	• Food	• Pigment	• Wax
• Insecticide	• Mineral	• Plastic	• Metal
• Ceramic	• Pharmaceutical	• Carbon	• Chemical

"Jet-O-Mizing" produces FINE PARTICLES ¼ micron average and above PLUS . . . Narrow Particle Distribution • Dry, or Controlled Moisture Content • Continuous Operation • Uniformity of End Product • Other Operations with Grinding • No Attritional Heat — No Moving Parts • Low Operating Costs • Low Maintenance

Send for complete information on Fluid Energy's "Jet-O-Mizer" Mills, "Jet-O-Clone" Dust Collectors, and TESTING AND CUSTOM GRINDING services.

FLUID ENERGY PROCESSING & EQUIPMENT COMPANY
Richmond & Norris Streets, Philadelphia 25, Pa. • Phone: Regent 9-7728
(Formerly known as the Wheeler-Stephanoff Mill)

Check 1847 opposite last page



How CFC FILTERS assure micro-clarity of Oronite Isophthalic

(Left) These stainless steel CFC Flo-Pac Filters remove micronic particles from the process stream in the production of Oronite Isophthalic.

(Above) Fulflo Filters, each containing 110 Honeycomb Filter Tubes, provide micro-clarity of reaction streams used in processing Oronite Isophthalic.

Isophthalic, one of the most important raw materials developed for the protective coating and plastics industries, gives outstanding new qualities to paints, baking finishes, polyesters, polyamides, plastics and plasticizers. Oronite Chemical Company, a subsidiary of Standard Oil Company of California, assures absolute clarity of Isophthalic with CFC Filters.

Oronite makes good use of both surface and depth filtration. The CFC Flo-Pac Filter provides surface filtration in removing impurities as small as 5 microns in size. Tough resin-impregnated pleated paper cartridges each have more than 6300 square inches of filtering surface.

CFC Fulflo Filters, with genuine Honeycomb Filter Tubes, give true *depth* filtration through hundreds of filtering tunnels engineered for uniformity of size, shape, depth and density.

Fulflo Filters provide any degree of micro-clarity (down to 1 micron) for all types of petrochemicals, liquid chemicals, pharmaceuticals, oils, liquid fuels, water, compressed air, other gases.

Look to CFC Filters — to improve product quality, reduce downtime, and cut production costs. *Write for technical literature or engineering assistance to Dep't CP*

COMMERCIAL FILTERS CORPORATION
MELROSE 76, MASSACHUSETTS
PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

MICRO-CLARITY AT MINIMUM COST

Fulflo FILTERS
with genuine Honeycomb Filter Tubes for controlled micro-clarity of industrial fluids.

CFC FILTERS
Selective filtration of oils • water-oil separators • magnetic separators • pre-coat filters • coolant clarifiers • automatic tubular conveyors.

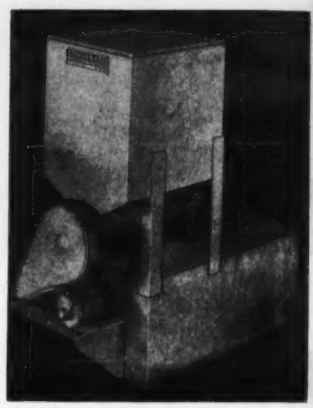
Check 1848 opposite last page

Automatic maintenance of solution strength, tank level

Uses: Automatic feeding of dry chemicals into water, mixing the two as they are introduced to main tank.

Features: Maintains tank solution level and strength automatically.

Description: When controlled-solution tank level drops, float valve actuates screw conveyor which accurately feeds dry chemicals from hopper. At same time, solenoid valve furnishes fresh water at rate necessary for proper solution in tank.



Tank replenisher automatically maintains solution tank level and chemical concentration

Electric tank agitator can be supplied when chemicals are not readily soluble.

(Tank replenisher is product of Cincinnati Cleaning & Finishing Machinery Co., 2058 Hageman Street, Sharonville, Ohio.)

Check 1849 opposite last page.

Moisture-control problem for nylon plastics solved by oven

High-capacity preheating and drying oven provides suitable moisture-control in granular plastic materials.

Oven body is of double-wall design, 22-gauge oven steel with three inches of mineral-wool insulation between walls. Dimensions are 72 x 40 x 58". Ten drawers

are each 20 x 30 x 3½".

Oven fan forces heated air up into distributing duct, located along one side of oven in work-chamber wall.

Heated air flows horizontally through numerous ports, over and under each drawer, then enters reciprocating duct

Preheating and drying oven maintains proper moisture control in plastic materials

at opposite side. Louvered dampers in duct permit control of heated-air flow horizontally.

(PLHD-2-5 oven is product of Despatch Oven Company, 619 S. E. 8th St., Minneapolis, Minnesota.)

Check 1850 opposite last page.

High efficiency reported for fractionation trays with ballast units

Combines features of bubble cap, perforated trays

Fractionation tray has been developed which reportedly combines the good features of bubble cap and perforated trays and yet eliminates the inherent problems encountered with conventional valve-type trays. The tray is designed around a new type valve or ballast unit which acts as a variable orifice to provide multi-staging of the slot-area through the various rates of vapor flow. A number of these ballast units are incorporated into each tray.

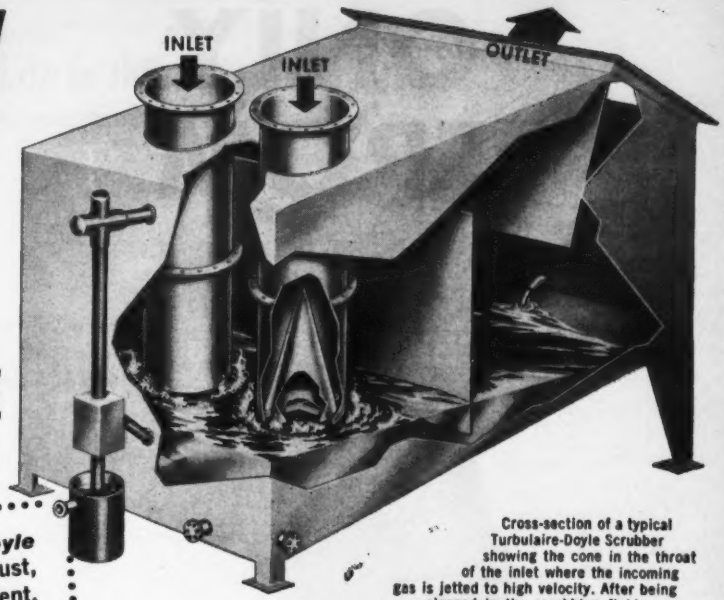
Design of the unit permits uniform distribution of vapor through liquid across the tray, throughout a wide range of capacity. Optimum vapor velocity through the liquid over

NEW

Savings and efficiencies in Gas Scrubber Applications

with the

TURBULAIRE-DOYLE SCRUBBER



Cross-section of a typical Turbulaire-Doyle Scrubber showing the cone in the throat of the inlet where the incoming gas is jetted to high velocity. After being cleaned in the scrubbing fluid, the gas passes over spray eliminator baffles before it is discharged. Collected material is carried away by the circulating scrubbing liquid—is recovered as a liquid concentrate or slurry.

With addition of the Turbulaire-Doyle Scrubber to its line of advanced dust, fume and fly ash collection equipment, there is no industrial gas cleaning problem that Western Precipitation cannot handle with equipment of its own design. This assures your dust and fume control problem receiving the benefit of the industry's most complete "know-how" in all phases of gas cleaning operations.

The Turbulaire-Doyle Scrubber — a development of The Consolidated Mining and Smelting Company of Canada Limited and widely used in its own diversified operations—is now made available to industry by Western Precipitation Corporation under a license arrangement with Cominco.

Actual plant records, compiled over long periods of service, show the Turbulaire-Doyle Scrubber to be unique among commercially-available scrubbers in the multiple advantages it offers...

★ *High Collection Efficiencies* — generally 97% to 99%!

★ *Fine Particle Collection* — including those in the fume range!

★ *Low Liquid-to-Gas Ratio* — only 1 to 5 GPM per 1000 CFM!

★ *Wide Application Flexibility* — readily adaptable to various types of corrosion-resistant materials!

SIMPLE, TROUBLE-FREE DESIGN

The Turbulaire-Doyle Scrubber impinges dust-laden gas at high velocity into a bath of scrubbing liquid. The high velocity forces the gas and dust particles to penetrate deeply into the liquid for complete wetting and cleansing. A cone in the gas inlet nozzle, just above the surface of the scrubbing bath, provides the jetting action that assures outstanding performance from this unit. *There are no moving parts, nothing to require frequent maintenance!*

If you have dust or fume control problems where scrubber types of collectors are applicable, it will pay you to investigate the *years-ahead* advantages of the Turbulaire-Doyle Scrubber. Write, wire or phone the Western Precipitation office nearest you for further details.

TYPICAL APPLICATIONS INCLUDE:

Cleaning Gases from sintering machines, blast furnaces, roasters, dryers, calciners, crushers, screens, ventilators etc., in a wide range of chemical, metallurgical, rock products, and waste disposal operations.

Cooling and Humidifying Gases from fertilizer, acid, carbonating, smelting, alloying, and reclaiming operations where cool, moist gases are necessary for proper processing.

COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIRE Jet-Cleaned Filters
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Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries

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Precipitation Company of Canada Ltd., 8285 Mountain Sights Avenue, Montreal 9

Check 1851 opposite last page

Ballast unit on fractionation tray acts as true variable orifice, boosts efficiency of tower

a broad range of flow rates is also reported. A large turndown ratio is obtained by progressive staging of the vapor openings from low to increasingly high flow rates. The units provide establishment of a primary pressure drop at the vapor-liquid interface, thereby obtaining maximum tray efficiency.

Results obtained to date indicate the following: 1) Efficiency of the tray from very low vapor rates (within 10 percent of flood point) up to moderate vapor rates, is higher than conventional trays of comparable capacity; 2) Turndown ratio (ratio of maximum to minimum vapor rates at which a high efficiency is maintained) is at least 9.0.

(Further information about the Glitsch ballast tray may be obtained from Fritz W. Glitsch & Sons, Inc., Dallas, Texas.)

Check 1853 opposite last page.

Backwash water filter works on 'dirt cycle', not time cycle

Differential in line pressure controls backwashing

Uses: Filtration of water.

Features: Operates on "dirt cycle" rather than time cycle. (Differential in line pressure between incoming and outgoing water automatically controls backwashing action.) Any individual filter may be

ONLY FROM KUHNS

DUCTILE IRON PIPE FITTINGS

Kuhns long lasting ductile iron pipe fittings for high strength and corrosion resistance are pressure rated by Underwriters' Laboratories, Inc. Most types and sizes are stocked for prompt delivery, along with our complete line of high quality cast and malleable iron fittings. Write for catalog today.

THE KUHNS BROTHERS CO.
1800 McCall St. • Dayton, Ohio

OVER 3,000 SHAPES AND SIZES

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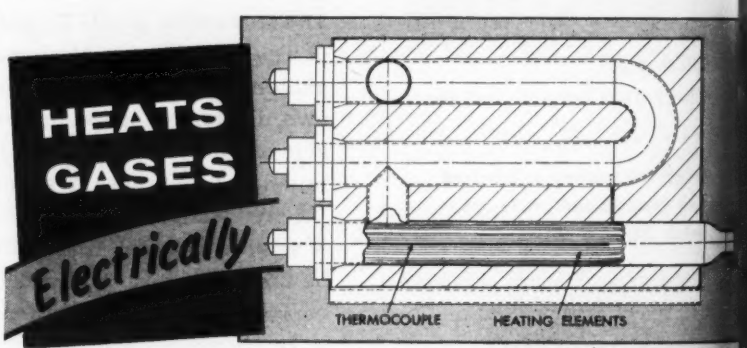
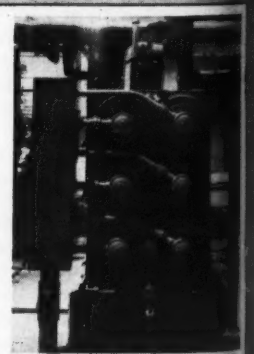


This heater was designed to provide heat of 788,000 Btu/hr. to raise a gaseous chemical to 750°F.

The interconnected U-tubes enclose electric heating elements over which the process gas travels continuously. The temperature and heat supply are automatically controlled.

This is another of the many types of heaters, heat exchangers, dryers and ovens Rockwell builds for the process industries. What's your heating problem?



ROCKWELL SINCE 1888 BUILT

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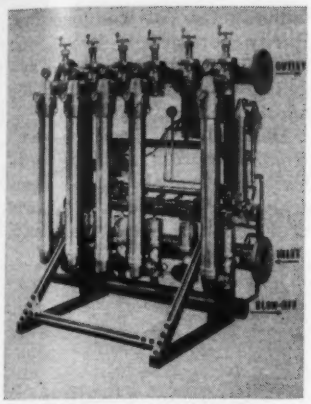

Pressure drop across filter controls backwashing action

Automatic filter has provision for manual operation in event of power failure. It is constructed of bronze and copper with either Monel or 316-stainless-steel filter element, 20- through 700-mesh.

Pressures up to 200 psi are handled at temperatures to 200°F. Capacity is up to 1000 gpm.

(Backwashing water filter is product of Ronningen-Petter Company, Vicksburg, Mich.)

Check 1855 opposite last page.

removed from line without shutdown of complete unit.

Description: Filter screens, sealed at both ends and mounted on strengthening perforated inners, insure non-short-circuiting filtration. Baffles and internal rings divert backwashing fluid out through mesh.

High pressures generated without compressors in electrolyzer

Turns out 99.9% pure hydrogen, 99.8% oxygen

Uses: Economical production of high-purity industrial hydrogen and oxygen.

Features: Generation of 30-atmosphere gage pressures

Binks spray nozzles

for washing, cooling, processing, humidifying, dehydrating, and hundreds of other applications.

You'll get the *right* nozzles quicker by calling Binks... manufacturers of one of the most complete selections ever produced.

There is a size and spray pattern for every purpose... with nozzles cast or machined from standard or special corrosion-resistant metals and materials.

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O. K. Binks, send me your comprehensive Spray Nozzle Catalog without obligation.

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Check 1856 opposite last page

Life in these excited states...

"Sunday morning is no time to call me about a little leak"

For Men Who Work 24 Hours a Day

Like the phone ringing when you're in the shower, corrosion and contamination wait for no man. Best way to confine it to normal working hours is to specify trouble-free Ace chemical-resistant equipment by American Hard Rubber Company. Best for the money anywhere... backed by 108 years of experience.

All-purpose rigid PVC. Sched. 40, 80 & 120, ½ to 4". Threaded or socket-weld fittings. Valves ½ to 2". NSF-approved. *Bul. CE-56.*

Improved design... now 12 gpm. All wetted parts acid-resistant, wear-resistant Ace hard rubber. Finest available. *Bul. CE-55.*

Flexible poly pipe, ideal for water lines, drains, underground pipe or conduit. Sizes ½ to 2", long coils, NSF-approved for drinking water. *Bul. CE-57.*

World's best chemical valves... at moderate prices. All-plastic, rubber-lined, or all-hard-rubber. ⅛" pet cocks to 24" gate valves.

ACE processing equipment of rubber and plastics

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See our pages in eec Catalog!

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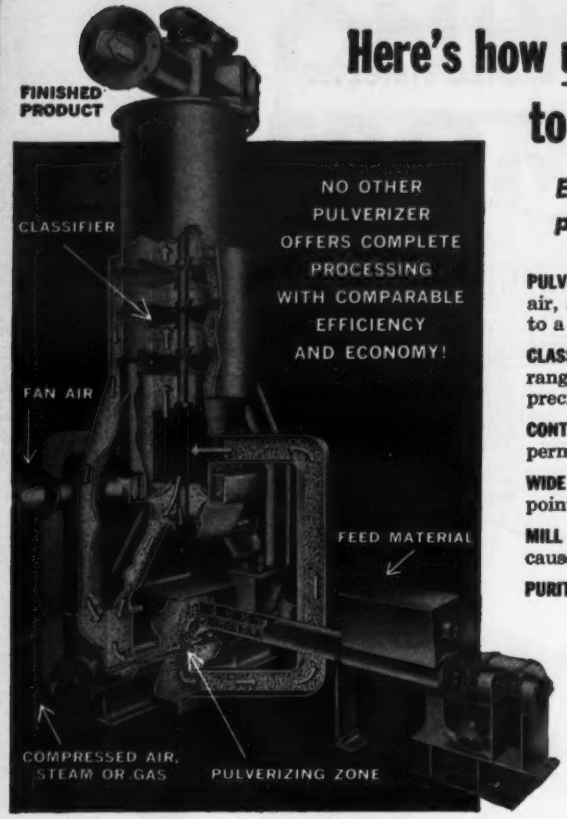
Here's how unique MAJAC Jet Principle works to improve Pulverizing Process!



Economy and efficiency of exclusive Jet-Stream collision process unmatched by any other pulverizer!

PULVERIZES by collision of particles in high velocity jet streams of air, steam, or gas. Produces particle sizes as coarse as ⅛" down to a top size of a few microns.

CLASSIFIES with unusual efficiency and accuracy within a broad range of variable settings. Classifier integral but separately and precisely controlled.

CONTROLS HUMIDITY, dries, blends or coats material as desired. Even permits chemical reactions.

WIDE RANGE OF MATERIALS can be handled from soft low-melting point organics to hardest abrasive materials.

MILL WEAR and maintenance are reduced to absolute minimum because particles collide with each other instead of wearing mill.

PURITY is maintained at highest level because of minimum mill wear.

Sizes available for lab, pilot plant and production use.

Write today for detailed information or visit by qualified Majac representative.

MAJAC, INC.

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Designers and manufacturers of pulverizing, classifying and separating equipment for industry.

Check 1858 opposite last page

King MANOMETERS

For Plant and Laboratory

King Manometers are rugged, low-cost instruments of unexcelled accuracy for measuring pressure, vacuum, differential pressure, and pressure-related phenomena. They're available in the following types, in a complete range of sizes:

U-Type Manometers

- Single Cleanout
- Double Cleanout
- With 3-Valve Manifold
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Well-Type Manometers

- Low-Well
- Raised-Well
- Barometric-Reading
- Flowmeter Type
- Inclined-Tube

Multi-Tube Manometers

- Individual-Well
- Common-Well
- Photo-Manometers

NEW CATALOG 2008 gives details on these and other models — includes manometer liquids and accessories — explains basic principles. Write —

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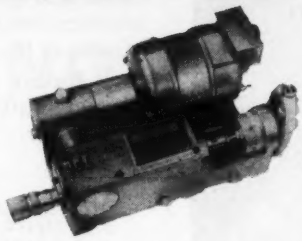
Check 1859 opposite last page

DCL metering pumps



The DCL Metering Pump provides a constant flow with facilities for infinitely varying the capacity at will

CHECK THESE FEATURES

- ✔ Flow controlled by Micrometer adjustment on pump plunger
- ✔ Flow adjustment may be made with pump at **rest** or **while pumping**
- ✔ Available in ten (10) capacity ranges 0-0.19 gals/hr to 0-9.9 gals/hr
- ✔ Operates at pressures up to 2400 p.s.i.

Territories Open For Stocking Dealers

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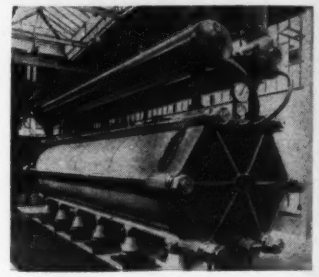
BEVERLY, MASSACHUSETTS

Check 1860 opposite last page

without use of compressors. Purity obtained is 99.9% for hydrogen and 99.8% for oxygen, thus eliminating need for additional purification.

Description: Pressure-electrolysis process is made possible by availability of electrolyzer developed by Lurgi of Frankfurt, West Germany.



Need for further purification of hydrogen and oxygen is eliminated with pressure electrolyzer

Capacity range of unit is 5000 to 25,000 cfm of hydrogen.

Use of high pressure, rather than atmospheric pressure, decreases the cell-voltage requirements corresponding to specific power consumption.

Power-consumption reduction results in 20% savings in energy. Saving in equipment floor space is 50%. Only labor needed is that to read gages periodically.

(Zdansky-Lanza pressure electrolyzer is distributed by Winfield Equipment Co., 20950 Center Ridge Rd., Cleveland 16, Ohio.)

Check 1861 opposite last page.

Efficiency, capacity high in centrifuge

Handles up to 600 gpm at reduced cost

Uses: Applicable over wide range of concentrations to clarification and thickening of slurries which contain extremely fine solids.

Features: High rotor speeds and capacity up to 600 gpm result in low power requirements per gallon of slurry treated.

Description: The 37" rotor operates at speeds up to 3300

To page 172

FLUIDICS

is a Pfaudler Permutit program providing
the know-how
the equipment
and the experience
for solving problems involving fluids

FLUIDICS covers:

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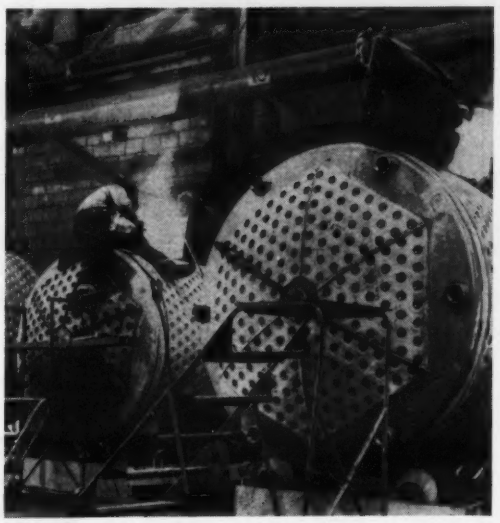


FLUIDICS AT WORK

How dimpled jackets slash cost of stainless steel reactors

By using dimpled jacket construction on large stainless steel reactors, Pfaudler reduces material costs as much as 20% over conventional jackets. Dimples reinforce both the tank metal and the jacket metal. Thus, lighter gauges can be used for the same jacket pressures, or conversely, higher jacket pressure ratings can be achieved with the same metal thicknesses.

Dimples also serve to interrupt the flow of jacket medium and produce maximum turbulence. Higher heat transfer rates result.

Pfaudler dimpled jacket construction is code approved for 150 psi jacket pressure and can be so stamped. This construction is standard on Pfaudler stainless steel reactors from 750 through 2000 gallons.

Conventional Jackets are supplied on 5 through 500 gallon Pfaudler reactors since the economic factors favor this design over dimpled construction.

Choice of Stainless Types. Through 500 gallons, types 304 and 316 are standard. Larger reactors are offered in these two types as well as 321 and 347 stainless.

Other Metals and Alloys Offered on custom order include Hastelloy B or C, nickel, Monel, Inconel, *titanium, zirconium,* and *tantalum.* Solid, clad or lined construction adds further flexibility to your selection.

Glasteel Reactors Too. Complete range of sizes through 4000 gallons, many of which are pre-stocked for quick delivery.

This wide range of choice of design and materials is typical of the solutions offered to problems through the FLUIDICS program. For further information on stainless steel, "wonder" metal or Glasteel reactors, write our Pfaudler Division, Dept. CP-59, Rochester 3, New York.

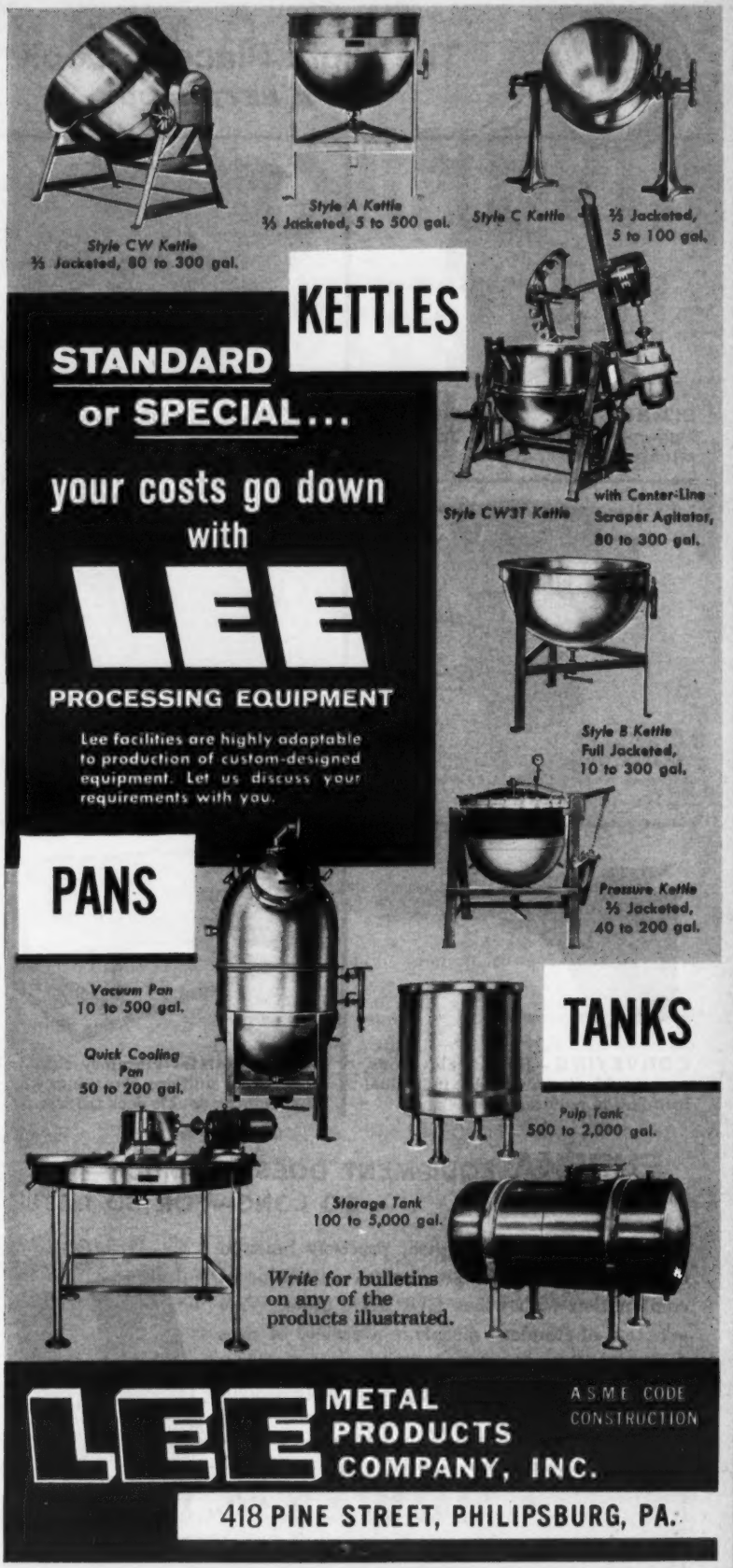
FLUIDICS AROUND THE WORLD

Pfaudler Permutit is observing its 75th anniversary. The company has manufacturing plants in Germany (Pfaudler-Werke A.G.), Great Britain (Enamelled Metal Products Corp., Ltd.), Canada (Ideal Welding Co. Ltd.), Mexico (Arteacero-Pfaudler, S.A.), and Japan (Shinko-Pfaudler Co., Ltd.), and four plants in the U. S. Sales offices and representatives in leading cities throughout the free world.

PFAUDLER PERMUTIT INC.

Specialists in FLUIDICS . . .
the science of fluid processes

Check 1862 opposite last page

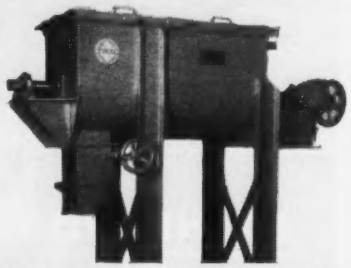

Style CW Kettle
⅓ Jacketed, 80 to 300 gal.
Style A Kettle
⅓ Jacketed, 5 to 500 gal.
Style C Kettle
⅓ Jacketed, 5 to 100 gal.
KETTLES
STANDARD
or SPECIAL . . .
your costs go down
with
LEE
PROCESSING EQUIPMENT
Lee facilities are highly adaptable to production of custom-designed equipment. Let us discuss your requirements with you.
Style CW3T Kettle
with Center-Line Scraper Agitator, 80 to 300 gal.
Style B Kettle
Full Jacketed, 10 to 300 gal.
Pressure Kettle
⅓ Jacketed, 40 to 200 gal.
PANS
Vacuum Pan
10 to 500 gal.
Quick Cooling Pan
50 to 200 gal.
TANKS
Pulp Tank
500 to 2,000 gal.
Storage Tank
100 to 5,000 gal.
Write for bulletins on any of the products illustrated.
LEE METAL PRODUCTS COMPANY, INC.
A.S.M.E. CODE CONSTRUCTION
418 PINE STREET, PHILIPSBURG, PA.

Check 1863 opposite last page

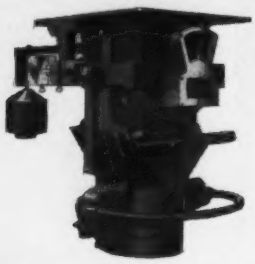
EUREKA

The Right Place to Look
FOR A BETTER BUY

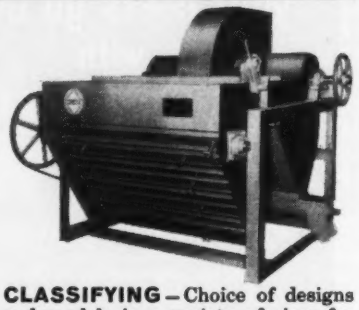
SIZING—New clean cut sizing at high speed without heat. Trial runs arranged in our plant.



MIXING—30 mixers, horizontal and vertical. Mixall and Sanimix in Stainless, and Standard.

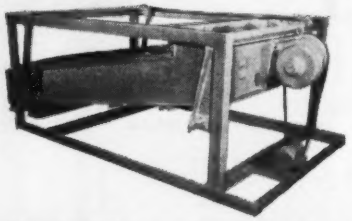


WEIGHING—Portable bagging scales and accessories. 2 models—weigh 25 to 200 lbs. Also packers.



CLASSIFYING—Choice of designs and models in a variety of sizes for individual requirements.

CONVEYING—Bucket elevators, screw and belt conveyors to individual installation requirements.

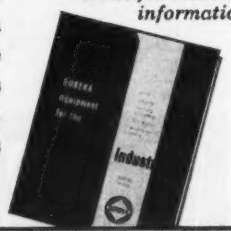


SCREENING—Vibratory closed-circuit rapid uniform screening. 7 sizes in single or double deck models.

EUREKA EQUIPMENT DOES SO MUCH—SO LONG—FOR SO LITTLE

Each unit expertly designed, precisely built to deliver efficient, durable service... alone or in combination with other EUREKA units. Wide selection of standard models in a variety of sizes and capacities or custom built to exact specifications. Your request for information or quotations will receive prompt, personal attention.

Write for technical information.



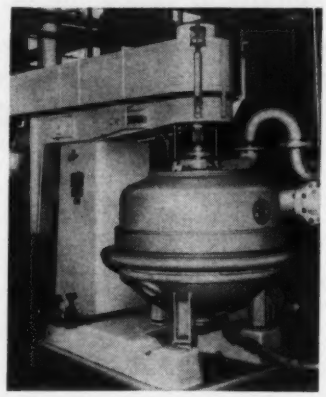
S. HOWES CO., INC.
MANUFACTURING ENGINEERS • SILVER CREEK, N. Y.

Check 1864 opposite last page

From page 170

rpm. Field testing of centrifuge with former model as control indicates following improvements:

1) In thickening corn starch gluten, feed rate was increased from 210 to 350 gpm. Feed solids concentration, overflow and underflow concentrations, and horsepower requirements were identical.



Centrifuge offers lower cost of operation

2) In clarification of cyclone overflow from second stage of a starch washing system, 575 gpm at feed concentration of 7 oz/gal was obtained as opposed to 380 gpm at 4 oz/gal. Overflow concentrations were 100 gr/gal, and horsepower was increased from 125 to 150.

3) A test involving algae concentration showed increase of from 200 to 385 gpm. Both machines required the same power and produced comparable concentrations.

Unit is currently available with stainless steel rotor and either bronze or stainless steel housing.

(Merco H-30 centrifuge is a product of Dorr-Oliver Incorporated, Stamford, Conn.)

Check 1865 opposite last page.

NEXT MONTH

How a time-of-flight mass spectrometer, used in conjunction with a vapor-phase chromatography unit, speeds analyses at Dow Chemical will be subject of feature article in this section next month.

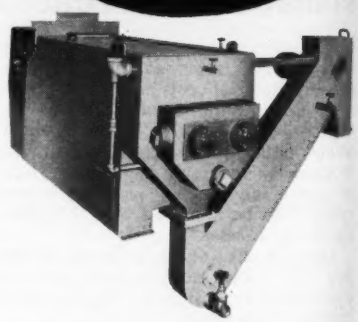
SPECIFY
"VISCOMATIC"
LIME SLAKERS!

ONLY INFILCO
has the EXPERIENCE gained from the manufacture and installation of many...

AUTOMATIC TORQUE CONTROLLED
constant viscosity lime slakers

THE **VISCOMATIC®** SLAKER

slakes lime as a paste with true pug mill action . . . slakes fast with cold water to provide maximum hydrate availability.



Torque actuated water controller maintains uniform viscosity... provides uniform strength slurry... eliminates temperature controls, water metering and insulation.

Write for INFILCO Bulletin 255. It describes the "VISCOMATIC" Lime Slaker and its utilization in water, waste, and process applications.

INFILCO
INFILCO Inc. • TUCSON, ARIZONA

Check 1866 opposite last page

Refiner combines work of two machines, cuts hp needs

Performs functions of jordan and disc refiner

Uses: Refining paper stock in pulp mills.

Features: Primary and secondary refining is performed in one machine. Unit can be used for most types and grades of paper. Horsepower usage is reported to be cut in half.

Description: Refiiners are available in various sizes with capacities ranging from 20 to 150 tons per 24 hours. Unit actually combines functions of jordan and disc refiner into single machine that can do the work of either one or both. Simplified design permits easy maintenance, parts replacement, and adjustment. Unit is also adaptable to hot stock refining.

(J-U-D refiner product of the Noble & Wood Machine Company, Hoosick Falls, N.Y.)

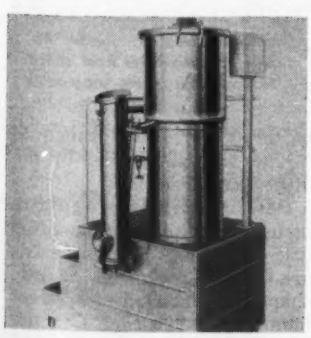
Check 1867 opposite last page.

Low-temp evaporator takes minimum space, is easy to operate

Uses: Processing heat-sensitive materials in chemical, pharmaceutical, and food industries.

Features: Evaporator is easy to operate and clean and occupies only minimum floor space.

Description: Units are fabricated entirely of stainless steel. Equipment is available in both laboratory and pro-



Compact evaporator is especially suited for processing heat-sensitive materials

EASY SEPARATION

Another Advantage of SANDVIK Steel-Belt Coolers

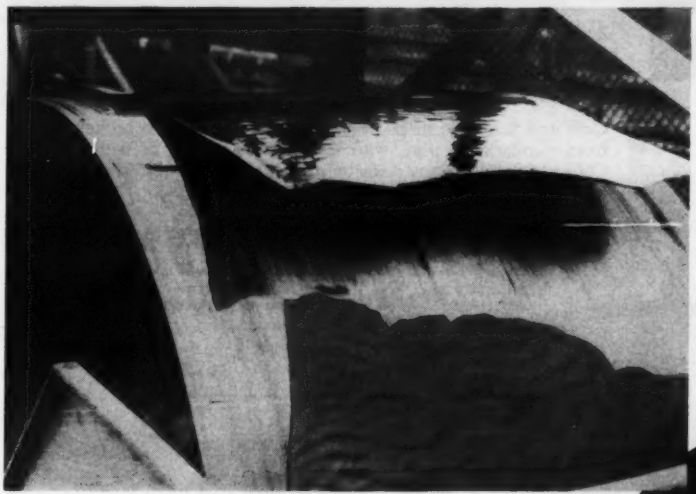
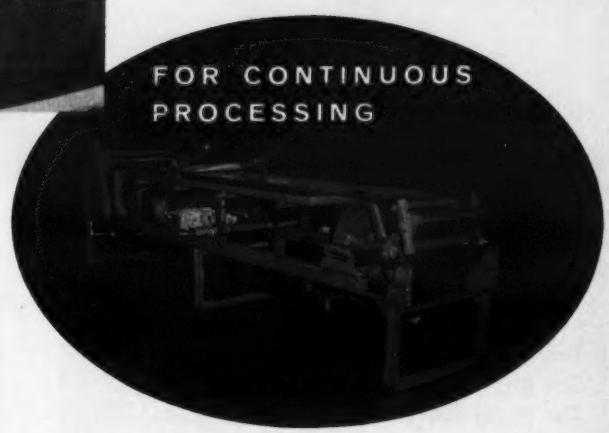
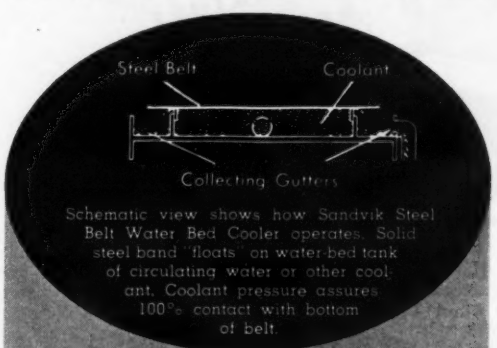


Photo shows how most materials cooled and solidified on the flat, horizontal surface of Sandvik steel belt separate easily at point where belt curves around pulley, even without the use of scraper blades.



Easy separation is just one of the many advantages that the Sandvik steel belt cooler provides for continuous processing of hot chemicals.

This patented unit is being successfully used to cool a wide variety of materials with feed temperatures up to 1900° F. On some applications capacities range as high as 25 tons per hour. It is used to cool and convey, regulate thickness while cooling, control temperatures in specified zones along the belt, cool materials in layers, cool loose materials, cool and strip off gelatinous materials in sheet form and many other operations. The belt can be hooded for humidity control of hygroscopic materials. Crystalline materials can be seeded or agitated on the belt at the correct temperature zone.



Schematic view shows how Sandvik Steel Belt Water Bed Cooler operates. Solid steel band "floats" on water-bed tank of circulating water or other coolant. Coolant pressure assures 100% contact with bottom of belt.

SOME TYPICAL EXAMPLES OF MATERIALS BEING COOLED ON SANDVIK WATER-BED COOLERS

Aluminum Sulphate
Ammonium Nitrate
Asphalt
Coal Tar Pitch
Chlorinated Wax
DDT
Gelatine
Maleic Anhydride
Phosphate Glass
Phtalic Anhydride
Polyethylene Wax
Resins:
(Hydro Carbon
Epoxy
Vinyl
Synthetic
Wood Rosins)
Sodium Metasilicate
Sulphur
TNT
Triphenol Phosphate
Zinc Nitrate
And Other Materials

Sandvik can supply cooling data on a wide range of materials. Sandvik also has portable, experimental cooling units available on which you can make small scale trials in your plant. Write or phone for further details.

SANDVIK STEEL, INC.
Steel Belt Conveyor Department
1702 Nevins Road, Fair Lawn, N. J.
SWarthmore 7-6200
Cleveland • Detroit • Chicago • Los Angeles
IN CANADA:
Sandvik Canadian Ltd., P.O. Dr. 1335, Sta. O., Montreal 9, P. Q.

SANDVIK STEEL BELT CONVEYORS

Check 1868 opposite last page

FROM BRIGHTON COME TANKS....and COILS and SCROLLS to suit your needs

PLAIN, JACKETED, CODE, AGITATOR

Brighton, since 1914, has fabricated tanks of all sizes, and in special shapes in Stainless Steel, Aluminum, Copper, Monel, Nickel, Evedur, Inconel. Modern equipment for fabrication, plus skilled workmen, insures quality products at minimum costs.

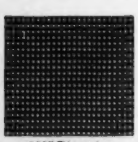
Coils and Scrolls in metal of your specification can be produced from standardized pipe, with tests hydrostatically or with air. Coils and Scrolls in any diameter up to 12 inches I.P.S.; 90 degree bends up to 12 inch diameter, I.P.S.

BRIGHTON
METALSMITHS EST. 1914 — CORPORATION — 820 STATE AVENUE · CINCINNATI 4, OHIO

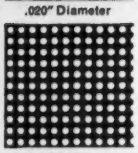
Check 1869 opposite last page

The *Right* PATTERN
The *Right* OPEN AREA
The *Right* MATERIAL
FOR EVERY SCREENING REQUIREMENT

H&K PERFORATED SCREENS



.020" Diameter



.045" Diameter

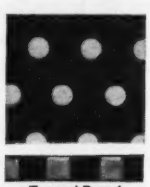
.028" x .125" Slot

For grading, sieving, dewatering, filtering, straining—when you want a screen "just right" for the job—you can depend on H & K.

H & K screens are made to your order, with holes accurate and uniform in size, shape and spacing. Burr-free holes are slightly larger at bottom—reduce blinding, save on down time. Margins and unperforated areas are furnished as specified.

Screens are made in practically any material desired... including plastic. H & K specializes in perforating stainless steel, monel and other corrosion-resistant alloys. Let us work with you on your screening requirements.

Just a few of the many H&K patterns are illustrated



Tapered Round Holes in Steel

No. 3 Diagonal Slot

FIND NEAREST H&K AGENT in the 'Yellow Pages'

Listed Under "Perforated Metals"

Write for H & K General Catalog

THE Harrington & King PERFORATING CO. INC.

Chicago Office and Warehouse
5636 Fillmore St., Chicago 44

New York Office and Warehouse
110 Liberty St., New York, N. Y.

Check 1870 opposite last page

- Hot Water Systems
- Floors, Walls, Ceilings
- Refrigerated Coils
- Insulation
- All Other Low Temps.

You can accurately read any low surface temperature with the Alnor Type 2300 Surface Pyrometer—in 3 to 5 seconds.

Take this rugged, portable instrument to any job in the field and see how performance to laboratory standards can save invaluable time in balancing out a system...save the money lost on call-backs. Large 6" mirrored scale is direct reading, no conversion...no errors in readings...1° per division. Precision jeweled movement is protected against abuses of portable service by sturdy walnut case. Comes complete with matched thermocouple and lead ready to use on your next trip out. Send for Bulletin 4257. Tear out this ad and mail on your letterhead to: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle Street, Chicago 10, Illinois.

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

Alnor

Check 1871 opposite last page

duction models. Operation is carried out at a low enough temperature so that there is no danger of damaging heat-sensitive materials.

(Tower-Anhydro evaporators are product of Tower Iron Works, Inc., Providence, R.I.)

Check 1872 opposite last page.

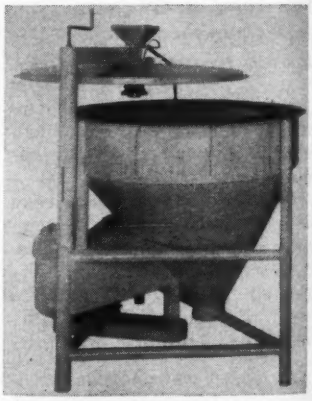
Unit continuously blends liquids with solids, solids with solids

Machine can handle wide range of solids up to ¼" in size

Uses: Blending liquids with solids or solids with solids on a continuous basis.

Features: Compact blender will handle wide range of solids, ranging from micron sizes to ¼" material. Unit having 28"-diam disc has capacity of 400 cfh. Several liquids and/or solids may be blended in one operation.

Liquid is dispersed without use of nozzles. Mixtures from ½ of 1% liquid to slurries can be produced. Wide range of liquids can be handled by the dispersing head.



Simply constructed, blender occupies only minimum floor space and can be easily cleaned

Description: Impingatron blender operates on rotating disc principle. Dry materials are fed to center of dished-shape disc rotating at approximately 850-900 rpm. Centrifugal force causes solids to flow out toward edge of disc.

Liquids are fed through tube

arrangement into annular trough of liquid distributor located above the disc.

Device rotates in same direction as disc and is equipped with dispersion elements that produce mist spray effect traveling at velocity slightly less than that of the dry material.

Liquids impinge on the spinning solids near periphery of rotating disc. Rolling action of solid material combining with mist spray produces uniform coating around each particle.

Simplicity of construction results in easy cleaning and maintenance. Horsepower and space requirements are kept at minimum.

(Impingatron blender is product of O'Brien Industrial Equipment Company, 1596 Hudson Avenue, San Francisco 24, California.)

Check 1873 opposite last page.

Gas scrubbers, purifiers, mist extractors, and separators for gas and petroleum industry are cataloged in four-page bulletin. Detail drawings, size data, applications, and photographs are included in Bul 601 — The V. D. Anderson Company, Division of International Basic Economy Corporation, 1935 West 96th Street, Cleveland 2, Ohio.

Check 1874 opposite last page.

Mist eliminator

. . . of knitted-wire mesh is used in vacuum tower of world's largest crude-oil unit. Tower is 38′ in diameter and over 150′ tall.

Mist eliminator is fabricated from stainless steel in 204 sections, weighs almost 1½ tons. It contains over 2000 miles of wire.

(Metex mist eliminator is product of Metal Textile Corporation, Roselle, New Jersey.)

Check 1875 opposite last page

WITHOUT CORROSION

Every surface that comes in contact with the pumpage is protected by glass fused to metal—in the Goulds-Pfaudler Fig. 3708 glassed centrifugal pump.

This pump can lick your corrosion or contamination problem when pumping corrosives like those listed here (and hundreds more). The tough glass-to-metal bond resists most acids at temperatures up to 350°F and alkalies at moderate temperatures. And, because glass is so smooth, it discourages product adhesion and scale build-up. No loss of product due to contamination, since glass is inert.

Choose from four different sizes and get capacities up to 700 GPM, heads up to 140 ft.

Write for Bulletin 725.2 for details, plus a second booklet, "It's What's Inside That Counts," for the inside story. Address Goulds Pumps, Inc., Dept. CP-59, Seneca Falls, New York.

GOULDS PUMPS

Check 1876 opposite last page

THE BIGGEST, NEWEST IDEA IN INDUSTRIAL GLOVES!

PROTECTION NORTH AT ALL POINTS · PVC Gloves by Jomac, job-proved for extra safety, extra wear

Check these advantages . . .

- **Extremely tough**—Last two to five times longer than ordinary industrial gloves
- **Very flexible**—Give greater dexterity than any other coated gloves. Made in sizes for maximum comfort
- **Highly resistant**—Nonflammable, nonoxidizing and resistant to practically all chemicals —will not crack or peel

Give your employees the maximum protection afforded by North PVC Gloves. There is a size to fit every hand—fit it comfortably, and in this way lessen fatigue and increase efficiency. You will find production going up, accident rate going down. Available in knit-wrist, band top and gauntlet types—palm and partial back coated styles.

FREE OFFER—On your business letterhead, kindly furnish details of your working conditions—and we will send you a sample pair.

We also make a complete line of North PVC chemical and foul weather protective garments and the famous Jomac loop-pile industrial gloves, handguards and safety sleeves for hand-to-shoulder protection.

1600 SERIES. Fully coated, heavy duty.

1800 SERIES. North-Grip—Permruff surface; for handling slippery surfaces.

JOMAC *Inc.*

Dept. N, Philadelphia 38, Pa.

Associated companies and distributors throughout the world

Check 1877 opposite last page

Linkage, valves, and heating elements of shower-eye wash combination are in insulated, heated cabinet — assuring dependable operation in winter

Shower and eye-wash helps plant handle

Dependability of 25 shower units on plant assured through use of design that is actuated by standing on platform — and by controlled electric heating that prevents freeze-ups

MERRICK PRATT, Safety Supervisor
The California Oil Company
Perth Amboy, New Jersey
with **CP Staff**

Problem: California Oil Company had to develop best procedure for handling a large variety of potentially harmful chemicals so that they would not become hazardous to personnel. In addition to acid and caustic used in large quantities, plant has various systems for injecting additives and inhibitors — many of which are harmful if they come in contact with the human body.

Along with protective clothing and other measures, plant utilizes safety showers and eye-wash fountains. The latter presented a winterizing problem because system had to be designed not to freeze.

First efforts were toward locating valves in pits below frost level. Because of poor soil conditions for drainage, this type of a shower proved to be impractical. Shower tests made daily filled pits with water, which promptly froze and prevented function of valve linkage.

Later steam tracing was tried. This prevented freeze-ups, but resulted in first shot of water being hot enough to damage eyes.

Solution: An above ground shower and eye-wash fountain combination, with working

Even with protective clothing, showers are important in achieving safety in chemical areas. Here protective suit is being decontaminated in shower

combination chemicals safely

parts in a steam-heated cabinet, was tried next. This design looked good. It saved the cost of an underground pit and prevented linkage troubles. Since temperature of water was sometimes too high, plant switched to thermostatically controlled electric heat for cabinet.

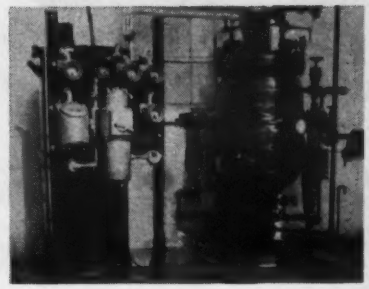
Shower unit selected as best for purposes of plant has two aluminum platforms — one on shower side and one on eye wash side. As soon as operator steps on either platform, water automatically flows through 1" quick-opening valve and washes chemicals away. Valve is self-closing. Shower units in some areas meet requirements for explosion-proof installations.

In general plant layout, areas handling primarily petroleum and not requiring protective clothing are kept free of potentially harmful chemicals insofar as possible. Hence, an employee does not have to wear protective clothing more than necessary.

Protective clothing, however, must be worn where required. Chemical areas at the Perth Amboy refinery are marked by a bright yellow line painted on pavement all around area. Such a line means that some kind of pro-

Operator testing eye wash side of safety shower unit. Eye wash and shower valves are opened by standing on grating treadles

PRODUCT IMPROVEMENT WITH PETRECO



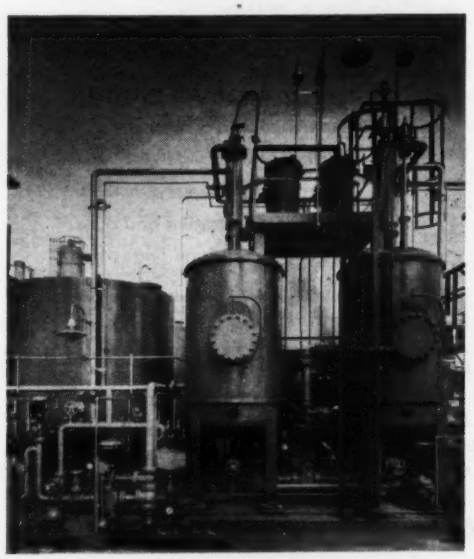
FACT-FINDING... FIRST HAND!

Getting the processing facts quickly and at minimum expense is a prime virtue of this Electrofining Process Pilot Plant. In contrast to its relatively small volumetric capacity (60 gallons), it has demonstrated astonishing throughput processing capacities.

ELECTROFINING precipitator pilot plant efficiently, economically pre-tests processing possibilities*

If you have a processing problem involving the contact of a hydrocarbon stream with chemicals, and the subsequent separation of the mixture, *get the facts on ELECTROFINING Equipment today*. The equipment insures intimate and instantaneous contact, thorough mixing, and a clean, immediate separation with minimum carry-over or effluent pollution. Processing is precise, automatic and continuous.

*ELECTROFINING *is a registered trademark of the Petrolite Corporation.*



COMMERCIAL ELECTROFINING EQUIPMENT

Note small space occupied by this installation. Its throughput is approximately 2500 barrels per day.

FOR MORE INFORMATION

write or call . . .

PP-59-2

PETROLITE CORPORATION

CANADA: Petreco, 4528 Stanley Drive, Calgary, Alberta
ENGLAND: Petrolite Limited, 46 Mount Street, London, W. 1
VENEZUELA: South American Petrolite Corporation, Hotel Avila, Caracas

PETRECO DIVISION

3202 South Wayside Drive, (P. O. Box 2546), Houston 1, Texas

1390 East Burnett Street (P. O. Box 7216), Long Beach 7, California

Representatives also in Brazil, Italy, Japan, Kuwait, Mexico, Netherlands and Trinidad

Check 1878 opposite last page

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Guaranteed Protection in Plant and Laboratory...

COATS • APRONS OVERALLS

Available in rubber, rubber latex and neoprene latex, in a wide range of styles and sizes. Carefully tailored to provide fine appearance, maximum comfort and long wear. Acid-and oil-resistant suits.

Safe-Durable-Comfortable

"GOODSEAL"

All-Purpose Gloves

Made of special compound impervious to actions of oil, acids, alkalies, animal fats and most other solids and solutions. Smooth, flexible, easy to wear. Highly resistant to snagging and puncturing. Extra-grip finish on finger tips.

BOOTS • SHOES • RUBBERS

Rubber and Neoprene Boots and Lace Work Shoes, and Maroon Butyl Boots, with or without "Toe-Saver"® Safety Toe. Slip-resistant soles. Plastic Boots. White Dairy Boots. Best quality Work Rubbers, net lined.

"If it's GOODALL, it MUST be Good!"

Contact Our Nearest Branch for Details and Prices

See Pages 348-349, Chemical Engineering Catalog

Standard of Quality—Since 1870

HOSE • BELTING • FOOTWEAR • CLOTHING AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL *Rubber Company*

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

BRANCHES AND DISTRIBUTORS THROUGHOUT THE UNITED STATES. IN CANADA: GOODALL RUBBER CO. OF CANADA LTD., TORONTO.

Check 1879 opposite last page

tective equipment is required. To find out what is required for entering area, unit operator can be contacted. Showers are locatel near chemical areas usually just outside yellow line.

Results: Use of shower and eye wash combination, which is actuated by standing on platform — along with electric heating method to prevent freeze-ups — has been found to be dependable. Plant has standardized on this type of shower, about 25 being in service in the Perth Amboy refinery.

Even with protective clothing, plant believes that a safety shower and eye wash fountain is necessary to safely handle certain chemicals. In the event an employee is sprayed, the shower provides a means of decontamination.

Excellent safety record of plant indicates that the general safety program has been effective in protecting employees.

(For further information on automatic safety shower and eye wash combination contact Morland Associates, 63 South Ave., Garwood, N. J.)

Check 1880 opposite last page.

Lighter aluminum pipe is stronger, thicker, at pipe ends

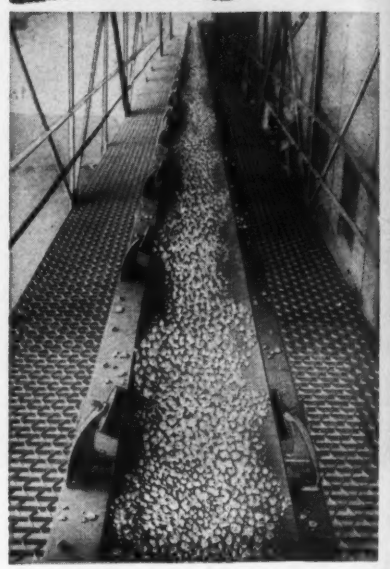
Cost savings to 27%

According to manufacturer, aluminum pipe development offers increased strength and thickness at pipe ends where welded or threaded joints are made, while actually utilizing less metal in the pipe body.

By putting metal where it is needed for strength in the joints, and eliminating excess thickness in pipe body, manufacturer claims operating pressures equivalent to standard pipe can be obtained with cost savings ranging by pipe size up to 27%.

Another feature of pipe is reduction of shipping and handling costs due to its lighter-than-conventional-aluminum pipe weight. Pipe is presently offered in selected

STUMBLING HAZARD ELIMINATED



Spilled materials on a solid walkway caused workmen to stumble and turn ankles. Installation of 80% open Irving Mesh Grating allowed materials to fall through and minimized the hazard.

★

For Safe, Strong, Slip-Proof Stair Treads Specify

IRVING "VIZABLEDG" TREADS

★

Manufacturers of Riveted, Pressure-Locked, and Welded Gratings of Steel, Aluminum and other metals.

"A FITTING GRATING FOR EVERY PURPOSE"

IRVICO

IRVING SUBWAY GRATING CO., Inc.

Originators of the Grating Industry

Offices and Plants at
5050 27th St., LONG ISLAND CITY 1, N. Y.
1850 10th St., OAKLAND 23, CALIFORNIA

Check 1881 opposite last page

sizes equivalent to many standard Schedule 40 and 80 sizes. However, extrusion process is flexible and can be adapted to wide range of diameters and wall thicknesses required in individual installations. Standard flanges and fittings can be used.

(Heavy-end aluminum pipe is product of Reynolds Metals Co., Richmond 18, Virginia.)

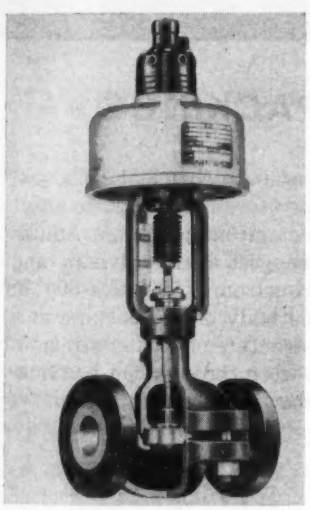
Check 1882 opposite last page.

Interchangeability feature of split-body valve line

Uses: Has high-temperature, high-pressure control application.

Features: Use of ISA standards for face-to-face dimensions permits complete interchangeability of valve line with all other standard makes of diaphragm valves.

Description: All major components including top-works, valve bodies, line flanges, and plug and seat



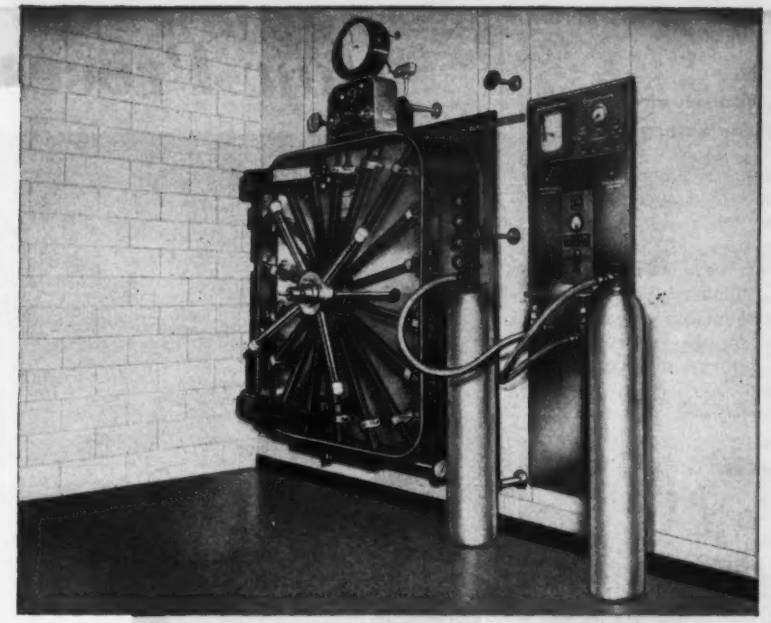
Face-to-face dimensions are based on ISA standards

rings, are of unitized construction. This makes possible development of 432 different valve combinations from single body.

(Split-body valves are product of Kieley & Mueller, Inc., 64 Genung St., Middletown, New York.)

Check 1883 opposite last page.

Looking for authoritative answers on Ethylene Oxide Sterilization of Heat- and Moisture-Sensitive materials?



American Sterilizer installation of large rectangular autoclave with automatic control for carboxide gas sterilization of heat- and moisture-sensitive materials. Routine sterilization with pressure steam is also accomplished automatically in this unit. Other equipment available ranges from the 16"x16"x30" self contained *Cry*-O-Therm to 60"x 66"x 120" single- or double-door models.

WHY ETHYLENE OXIDE?

As long as ten years ago, American Sterilizer researchers settled upon Ethylene Oxide (inerted with suitable diluents) as the agent of choice for the rapid and dependable sterilization of heat- or moisture-sensitive materials. Advances in such varied fields as pharmaceuticals, surgical supplies and packaging have greatly broadened the range of applications for which this versatile sterilizing agent is recommended. But they have also clearly signaled the need for a precise relationship between such factors as temperature, humidity, pressure, exposure, concentration and diluents in effecting optimum conditions for each specific application.

WHY AMERICAN STERILIZER?

Our ten year study of the characteristics of Ethylene Oxide has been paralleled by an equally thorough development of instrumentation. As a result, American Steriliser techniques and installations are successfully serving an ever-widening range of industrial and commercial processes requiring the sterilization of heat- and moisture-sensitive materials.

Because we have accumulated the largest body of data and experience in this field, we can advise you authoritatively. Because we offer the broadest range of automatic equipment for standard or special application you enjoy significant benefits of economy and continuing efficiency.

SEND FOR THIS FREE BASIC LITERATURE

Basic literature on "Ethylene Oxide Sterilization for Industry" is available upon request. Engineers of our Scientific Division are "on call" for consultation on processes, techniques or packaging and Experimental and Pilot Plant facilities are available through our Research Division.

Write for Bulletin 1C-602

AMSCO

AMERICAN STERILIZER

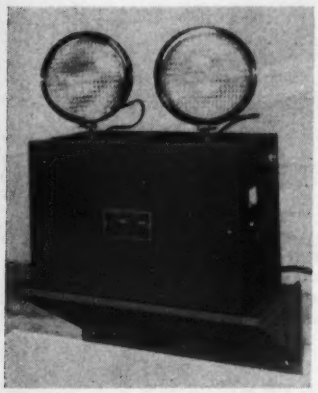
ERIE • PENNSYLVANIA

Scientific Division

Check 1884 opposite last page

Twin, flood-type lights ready for emergency

Automatic, emergency lighting unit contains voltmeter, test switch, pilot light, and safety fuse, all mounted on side of case. Two sealed-beam, flood-type heads are mounted on top of case. They will supply approximately four hours of continuous lighting.



Emergency lighting unit will supply four hours of continuous light

Charging system is completely automatic. Unit comes with nickel-cadmium battery (Model 59-NC) or Willard battery (Model 59-W). Batteries are 6-v, 30-amp-hr type.

(Automatic emergency lighting units are product of Electric Cord Company, 21 Spruce St., New York, N.Y.)

Check 1885 opposite last page.

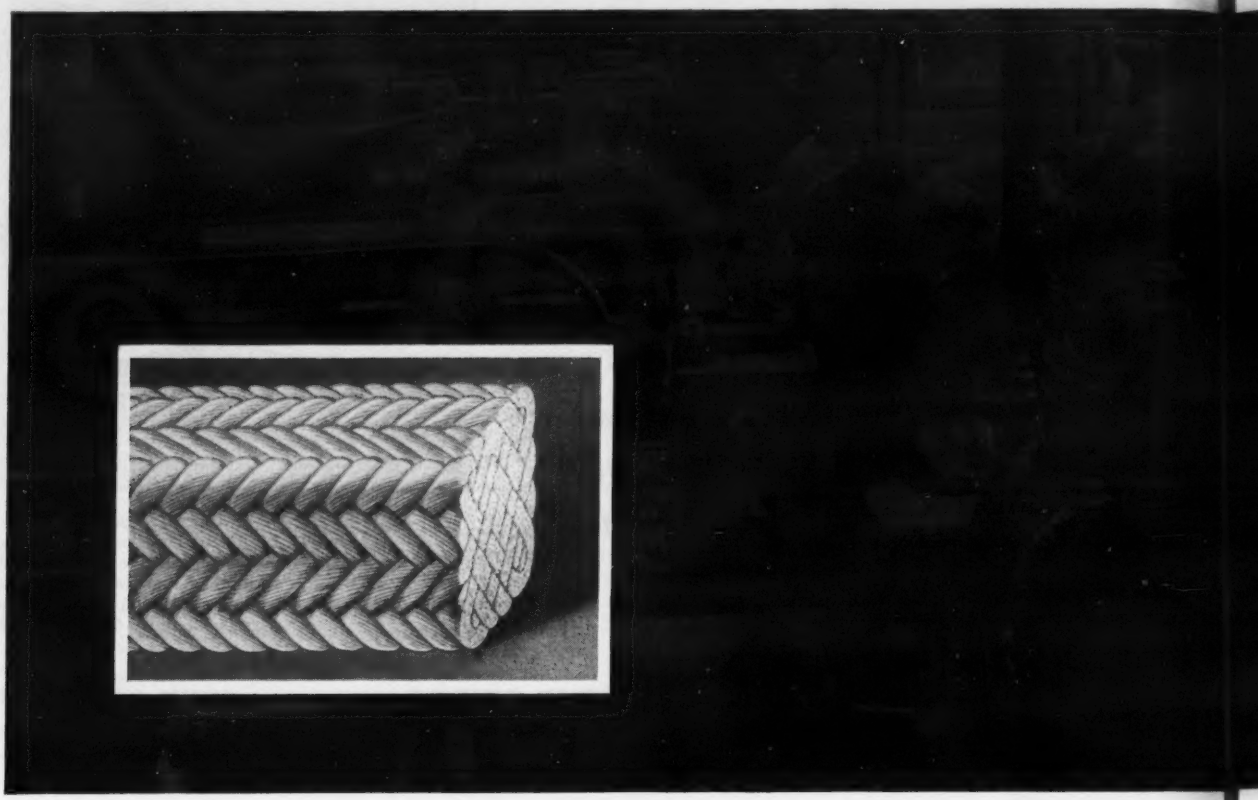
Adjustable while running, simple volumetric pump mounts in 1/2" line

Uses: Designed specifically to add sodium silicate solutions to prevent corrosion in domestic water lines, unit will pump small quantities of any solution not corrosive to brass and stainless steel.

Features: Unit mounts directly in ½" pipeline. Pumping rate is adjustable while running over 50:1 range.

Description: Volumetric pump for small flow rates uses standard Barber-Colman mo-

How Processors Seal Corrosives...



GARLOCK LATTICE-BRAID* TEFLON† PACKINGS

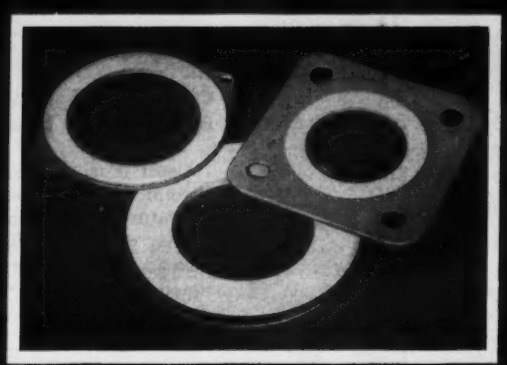
On pumps and engines, LATTICE-BRAID TEFLON is just about perfect against petrochemicals, oils, and gases of all kinds. It is strong, long-lasting, chemically-inert. Less gland pressure is required to effect an adequate seal, resulting in longer sleeve and packing life, less downtime and maintenance. Add to these features the advantage of Teflon: completely unaffected by the strongest acids, solvents, and alkalies; extremely low co-efficient of friction; withstands temperatures ranging from −120° to +500° F. In LATTICE-BRAID construction each strand passes diagonally through the body of the packing at a 45° angle. This through-and-through braiding makes a completely unified structure of greater strength. Ordinary braided packings become worthless once the single outer cover is worn through. On LATTICE-BRAID, there is no single outer cover; the braiding, therefore, holds together far beyond the limits of other packings, resulting in longer life.

*Registered Trademark
†DuPont Trademark for TFE Fluorocarbon Resin

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Molded and Extruded Rubber, Plastic Products

...Lower Maintenance Costs



GARLOCK TEFLON-JACKETED GASKETS

For piping, flanges, and fittings, TEFLON-jacketed gaskets give you the advantage of using TEFLON without sacrificing resiliency and deformability . . . particularly important on your glass-lined process equipment, light metal flanges, and glass pipe flanges and fittings.

Garlock offers TEFLON-jacketed gaskets in four basic designs—slit envelope, milled envelope, formed shield, and double jacket. Once you've selected the design best suited for your application, choice of filler material and thickness of the gasket becomes extremely important. Here, too, Garlock has a material for every operating condition—for high pressures, a corrugated stainless steel filler is suggested. Where the application is for glass-lined steel connections with low bolt loads, a rubber filler should be sandwiched between woven asbestos cloth. Cork, rubber, asbestos are just a few of the filler-types available.

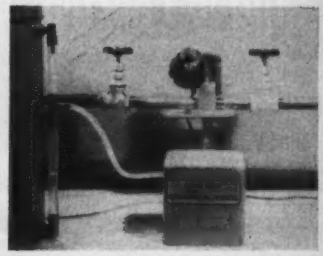
Get more details on LATTICE-BRAID TEFLON Packings and TEFLON-Jacketed Gaskets from your local Garlock representative. He can recommend from the Garlock 2,000 . . . two thousand different styles of packings, gaskets, and seals for every need. Call him, or write for Catalog AD-131 (LATTICE-BRAID Packings) and AD-154 (TEFLON Gasketing).

THE GARLOCK PACKING COMPANY, Palmyra, N. Y.

For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.

Canadian Division: The Garlock Packing Co. of Canada Ltd.
Plastic Division: United States Gasket Company

Check 1886 opposite last page



Volumetric pump's motor is wired in parallel with water pump and flow of silicate adjusted to 3 drops to each gallon of water

tors available in wide range of speeds and power ratings from 5 to 100 watts. Motor may be stalled indefinitely, without damage, when discharge pressure exceeds pump capacity.

Pump can be supplied with micro-switch to count strokes or cause pump to operate thru one cycle in response to action of any three-way switch.

(Volumetric pump is product of Lester-McKinney, Water Specialists, Inc., 815 Edgmont Avenue, Chester, Pa.)

Check 1887 opposite last page.

Pipe twists and bends without breaking

Uses: Applications where high pressures and extreme beam and crushing loads would be encountered. Particularly for underground gas- and water-service mains, high-pressure process piping.

Features: Pipe will twist and bend without breaking.

Description: Wide variety of joints are available. These can be easily assembled and are bottle-tight. Pipe is inspected and tested in accordance with ASTM specifications.

(American ductile iron pipe is product of American Cast Iron Pipe Company, PO Box 2603, Birmingham 2, Ala.)

Check 1888 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Spherical-tank scaffold rotates on center axis

Uses: For working inside spherical tanks.

Features: Latitudinal sections of work platform are telescopic to permit access to every part of sphere.

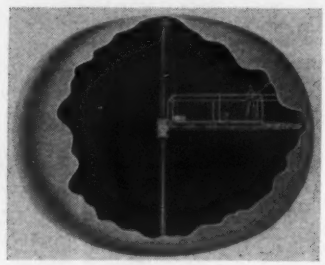
Description: Prerequisite for this type of scaffold is installation of uniform-diameter length of tube from top to bottom of sphere. Also needed is revolving ring to which a snatch block is attached.

Entire assembly can be rotated on axis, giving accessibility to every portion of fabricated sphere.

All-welded-steel scaffold can be fabricated for capacities ranging from 500 to 1500 lb. Guard rails are demountable.

(Spherical-tank scaffold is product of Atlas Industrial Corp., 849 39th St., Brooklyn, New York.)

Check 1890 opposite last page.



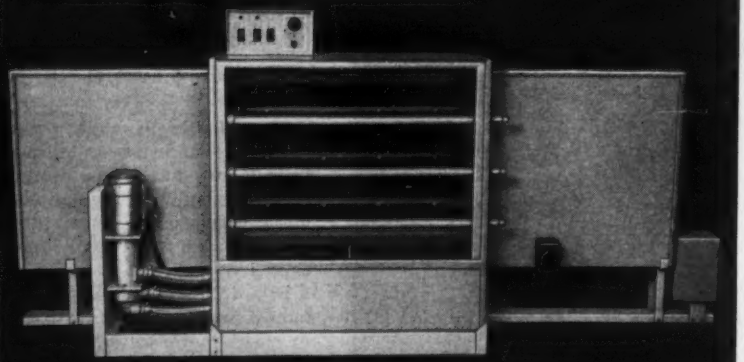
Horizontally telescopic construction of scaffold permits access to any part of spherical tank

Chromic acid detected by fresh filter paper

Uses: For detection of chromic-acid mist.

Features: Detector utilizes freshly sensitized filter paper instead of factory-impregnated type.

Unique Fabrication Shows Versatility of VAN-COR PVC



Production Etcher for Printed Circuits, made by Centre Circuits, Inc., State College, Pa.

To resist acid corrosion, this etcher is primarily made of Van-Cor PVC pipe, fittings, (standard and specially machined), valves, sheet (transparent and regular), and joining strips.

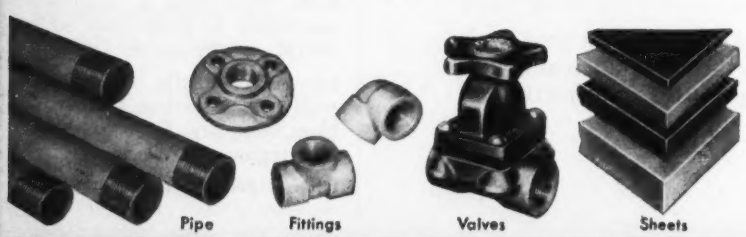
HOW CAN VAN-COR SERVE YOU?

Van-Cor PVC has many applications for plant use, or in your end product. It is ideal for plating equipment, filters, flux spray booths, chemical treatments, bleaching operations, glass polishing, and corrosive fume handling in general.

ADVANTAGES OF VAN-COR

1. Resists Corrosion of Industrial Acids & Alkalies
2. Light in Weight (½ that of Aluminum)
3. Easily Installed; High Tensile Strength; Low Flow Resistance
4. Readily Formed, Machined, Threaded and Welded

Write for Catalog and Name of Nearest Distributor

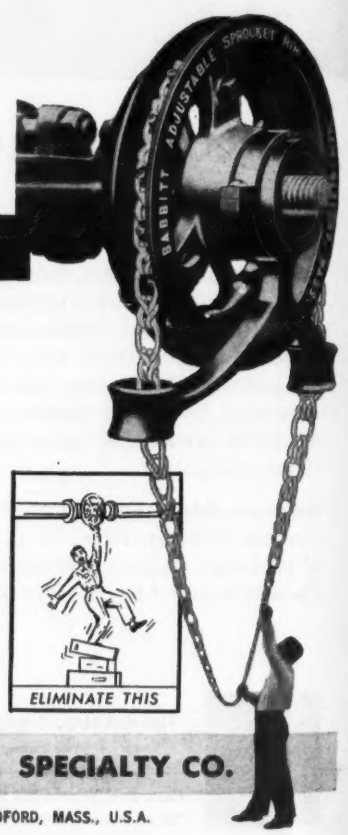


Pipe Fittings Valves Sheets

INDUSTRIAL DIVISION OF...
COLONIAL PLASTICS MFG. CO.
Subsidiary of THE VAN DORN IRON WORKS CO.
2685 EAST 79TH STREET CLEVELAND 4, OHIO

Check 1889 opposite last page

Safe Operation of Overhead Valves with a



Babbitt

Adjustable
SPROCKET RIM
with Chain Guide

- Simplifies pipe layout
- Fits any size valve wheel
- Easy to install and operate
- Operates any valve from plant floor
- Time and money saving fixture
- No maintenance; first cost *only* cost
- Packed, completely assembled, one to a carton
- Hot galvanized, rust-proof chain available for all sizes
- Easy to follow instructions with each unit
- Your supplier carries complete stocks
- Write for new descriptive catalog sheet and prices

Babbitt STEAM SPECIALTY CO.
14 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

Check 1891 opposite last page

Description: Sensitizing reagents are supplied in sealed plastic tube and enclosed in glass ampule. Reagents do not deteriorate during long storage. Mixture is prepared without opening tube and is good for one day.

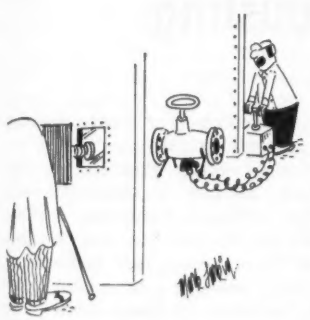
Sensitizing reagents for filter paper are supplied in sealed plastic tube

Four strokes of hand pump, after filter is sensitized, produce color change if chromic acid mist is present. Comparison of color with those on reference card indicates amount present.

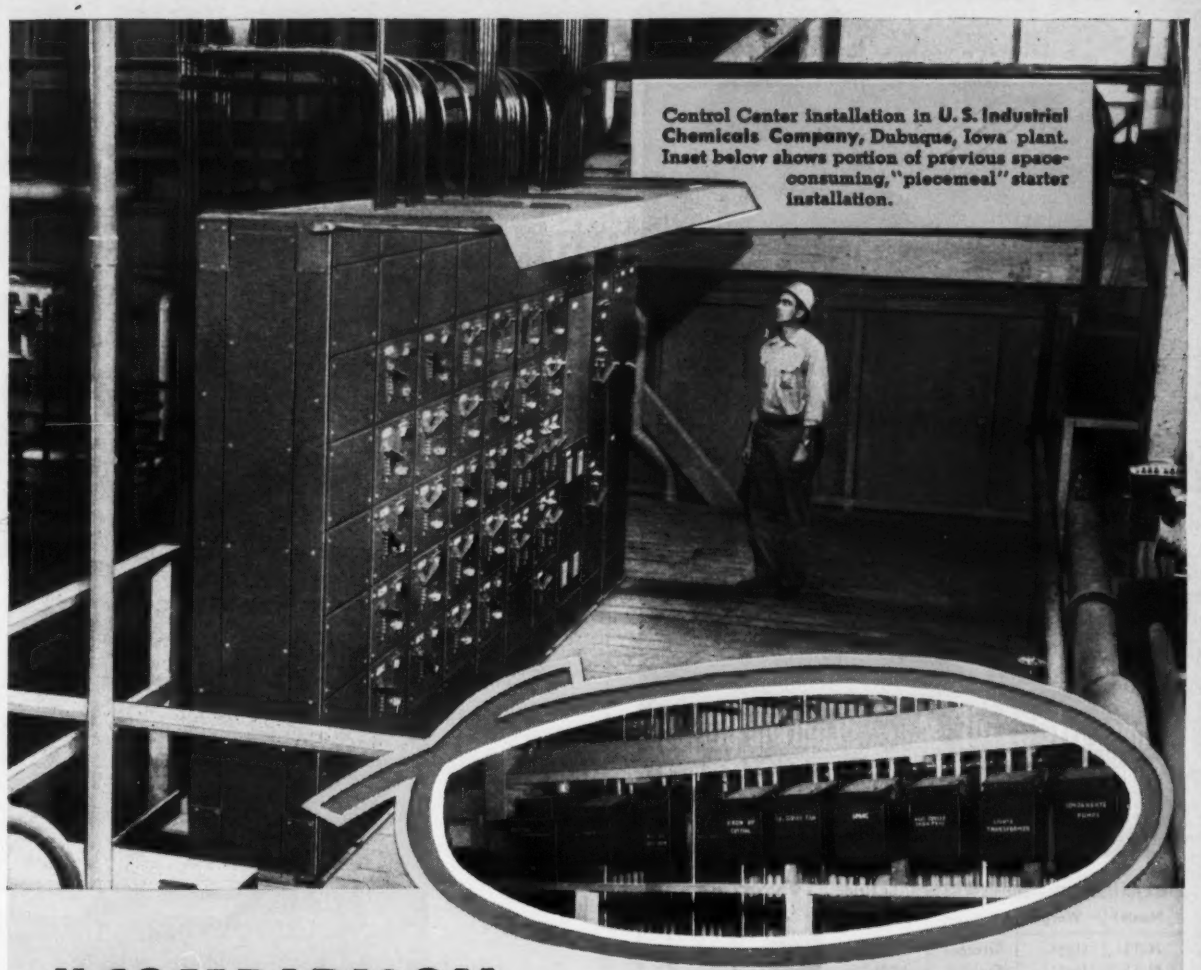
Detector is supplied in carrying case and includes four reagent syrettes and 24 filter papers. Additional papers are available separately in any quantity.

(Chromic-acid-mist detector is product of Mine Safety Appliances Company, 201 N. Braddock Ave., Pittsburgh 19, Pennsylvania.)

Check 1892 opposite last page.



". . . Ready for the exploded view?"



Control Center installation in U. S. Industrial Chemicals Company, Dubuque, Iowa plant. Inset below shows portion of previous space-consuming, "piecemeal" starter installation.

"COMPARISON convinced us that a SQUARE D Control Center offered us MORE!"

These design features make Square D your logical choice, too . . .

INCREASED SAFETY because bus bars are fully enclosed, rigidly supported and have ample cross section. Circuits are isolated by individually enclosed plug-in units. Disconnect handle designed for maximum operator protection.

FLEXIBILITY. Individual plug-in units or complete sections are easily added, removed or exchanged. Pushbuttons, pilot lights, and selector switches are readily added to unit doors.

INSTALLATION ECONOMY. All wiring channels are large and accessible from front without removing units. No "wire fishing."

SPACE ECONOMY, TOO. Up to eight combination starters fit in a 20" x 20" x 90" section. Plug-in unit heights designed in space-saving increments of 3 inches.

NOW . . . EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE!

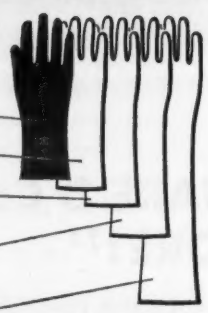
SQUARE D COMPANY

Check 1893 opposite last page

These Stanzoil® Milled Neoprene Gloves
Guarantee Positive Liquidproof Protection in
103 Basic Oils, Acids, Caustics, Greases, Solvents

Black All Neoprene Stanzoils With Non-slip Grip

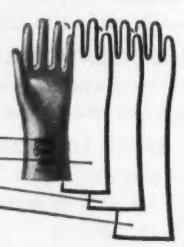
Model	Weight	Fingers	Length
N-31	Light	Straight	10½"
N-35	Light	Curved	10½"
N-32	Medium	Straight	11"
N-36	Medium	Curved	11"
N-41	Heavy	Straight	12"
N-44	Heavy	Curved	12"
N-51	Heavy	Straight	14"
N-33	Light	Straight	14"
N-54	Heavy	Curved	14"
N-71	Heavy	Straight	18"
N-73	Light	Straight	18"
N-74	Heavy	Curved	18"



White All Neoprene Stanzoils With Smooth Finish

Model	Weight	Fingers	Length
N-30	Light	Curved*	10½"
NW-31	Light	Straight	10½"
NW-32	Medium	Straight	11"
NW-41	Heavy	Straight	12"
NW-51	Heavy	Straight	14"

*Non-slip



Mail This Coupon Today

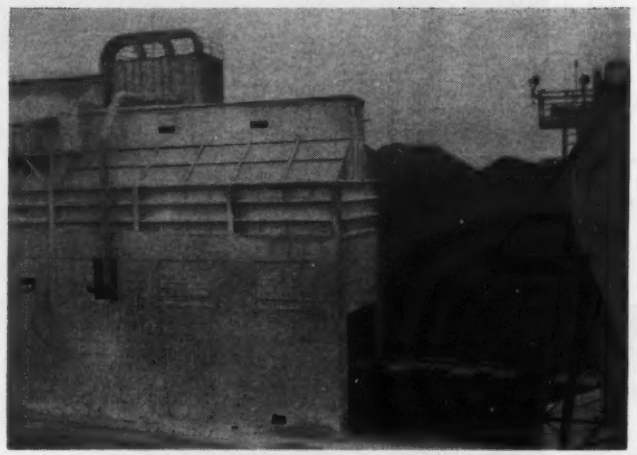
The PIONEER Rubber Co. (Neoprene)
241 Tiffin Road . . . Willard, Ohio

Please send me:

☐ 1958-59 Pioneer Industrial Glove Catalog
☐ 17" x 22" Full Line Glove Wall Chart
☐ Job Description Form For Free Hand Protection Analysis

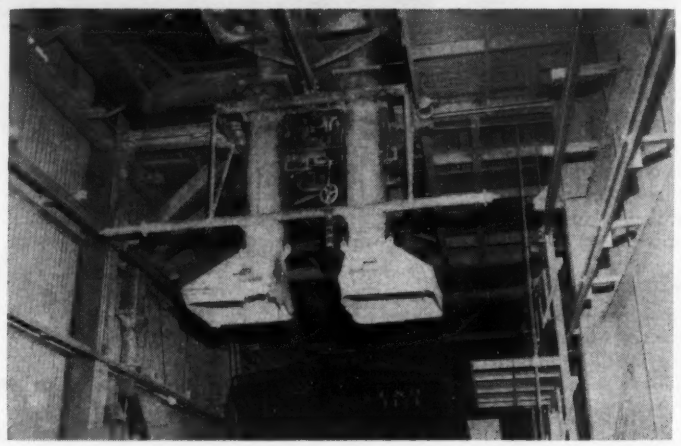
Firm.....
Address.....
City.....Zone.....State.....
Requested by.....

Check 1894 opposite last page



Lime loading building. Dust collector mounted on top of building has eliminated lime-dust problem

Twin movable hoods on monorail telescope down to insure tight fit around hatch of railroad cars. Dust leakage is kept to a minimum



Although there were extension sleeves from hoppers to cars, burned-lime loading caused large quantities of dust. By installing a dust collector with concentric-tube hoods, a midwestern chemical manufacturer . . .

Halts heavy lime dusting

Problem: Lime dust was a nuisance and a hazard at a midwestern chemical manufacturing plant. Approximately 250 tons of burned lime (CaO) are shipped daily in tank truck and railroad cars. Lime is held in bulk storage in overhead hoppers. During loading, the car is placed beneath hopper valve and lime fed by gravity into car. Large quantities of dust given off during this operation made control measures necessary.

Although extension sleeves reached from valve to car tops to direct the flow of lime, dust still escaped. Workers were required to wear respirator masks, hoods, and other protective clothing.

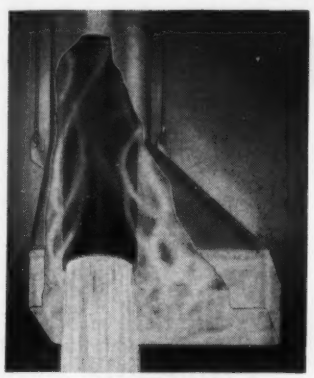
Problem was even greater during warm, humid, or wet weather. Clouds of dust were released from the building and carried throughout the neighboring area. Since resort and residential properties were nearby, a potentially serious public relations problem existed.

Solution: In summer of 1957 a dust control system was installed consisting of a cloth-bag collector and movable hoods with concentric duct work. Collector is a three-compartment continu-

ous automatic filter with automatic timing and shaking controls. Two compartments filter while the third automatically shakes down accumulated lime dust. Unit operates a regular 40-hour week but could operate continuously if production required. It handles 10,000 cfm of air.

Filter elements in baghouse are nylon tubes 5″ in diameter and 112″ long. Closed top of bag is suspended from double-prong hangers. Dust enters through bottom of bag.

Twin movable hoods traveling on a monorail permit use



Sketch of concentric tubes. Lime is funneled down inner tube while dust and fumes are drawn up through enclosing pipe

of all loading valves without need for individual hooding. Hood is located at end of two concentric tubes and completely encloses the car opening when in use.

Burned lime is funneled down through the inner tube while dust and fumes are drawn up through enclosing pipe. Dust then passes through a series of vent pipes to collector, located on the roof approximately 80′ above loading area. Collected dust is shaken from filter bags and returned by a rotary valve and conveyor system to central lime storage hopper.

Results: Since installation of dust control system, it is not necessary for workers to wear masks or protective clothing. The problem of lime dust blanketing surrounding area is now under control.

Actual savings effected

Calling in equipment representatives on your processing job?

Be sure <u>one</u> of them is from
AMERICAN-Standard
Industrial Division

You benefit by discussing equipment-selection with an engineer. American-Standard* Industrial Division is engineer-staffed from brass to branches. Combining three American-Standard divisions—American Blower, Ross Heat Exchanger, Kewanee Boiler – this new organization offers *one-source responsibility* for quality and performance in equipment designed, engineered, and manufactured to work together. There are offices in all principal cities; contact the one nearest you. American-Standard Industrial Division, Detroit 32, Michigan. In Canada: American-Standard Products (Canada) Limited, Toronto, Ontario.

Firebox, scotch-type steel boilers and package units for heat, power, steam.

Heat exchangers, condensers, and feedwater heaters for every requirement.

Fluid drives for stepless, adjustable-speed control of driven machinery.

*AMERICAN-Standard and Standard® are trademarks of American Radiator & Standard Sanitary Corporation.

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AMERICAN BLOWER PRODUCTS • ROSS PRODUCTS • KEWANEE PRODUCTS

Check 1895 opposite last page

through recovery of burned lime dust have not been calculated because main objective of the control system was to abate dust condition. However, volume is large enough to require a continuous recovery system to cope with the amount of material that is collected.

(Dust control system was installed by Wheelabrator Corporation, Mishawaka, Ind.)

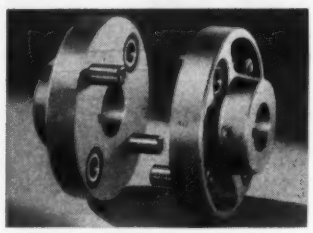
Check 1897 opposite last page.

Positive, resilient drive without lubrication

Uses: On direct-driven machinery where torque is not excessive in relation to shaft diameter.

Features: Four studs and rubber-cushioned sleeve bearings provide positive or resilient drive.

Description: Cast semi-steel



Coupling flanges are machined on periphery and face to simplify alignment checking

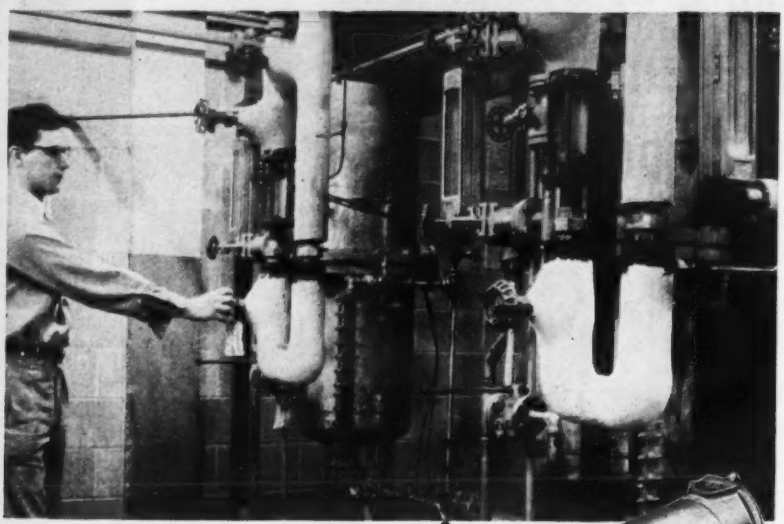
flanges are accurately machined on periphery and face. This simplifies checking alignment with feeler gage or straight edge. Couplings are made in four sizes with 1¼, 1¾, 2¼, and 2¾" maximum bore, respectively, and standard square keys.

(Series 400 couplings are product of Ajax Flexible Coupling Co., Inc., Westfield, New York.)

Check 1898 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Young Helps Tame Hot Nitric Acid!



Young

Stainless Steel Heat Exchanger lowers temp from 140 to 70F with minimum pressure drop!

The problem: How to recover 140F nitric acid used in development work at Abbott Laboratories? The solution: Install Young Stainless Steel Heat Exchanger to lower the acid temperature to a convenient 70F with minimum pressure drop. All component parts of the heat exchanger are constructed from #316 stainless steel and require little or no maintenance, even with liquids as corrosive as nitric acid. Tubes are rolled into header by an electronically controlled process making a highly efficient joint. The entire unit is engineered to withstand maximum expansion strains.

Ideally suited for use with highly corrosive liquids or gases, Young Stainless Steel Heat Exchangers are available in single or multi-pass units. If you have a corrosive cooling problem, consult Young Radiator Co. — without obligation.

Write for catalog 1258
Dept. 379-E

Young RADIATOR COMPANY
RACINE, WISCONSIN
Creative HEAT TRANSFER ENGINEERS
Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Mattoon, Illinois

Check 1896 opposite last page

PRIME MOVER OF AIR

Aeromaster FANS

higher efficiency

lower operating costs

Aeromaster Fans move *hot* air more efficiently by delivering *more* CFM and requiring less horsepower. Adjustable pitch heat-treated aluminum alloy blades have excellent corrosion-resistance qualities. Used in refineries, gas transmission stations, steel mills and industrial plants for major heat transfer systems. 4 to 6 blade fans available 54" to 22' diameters. For more details on fans that cost less to install, operate and maintain, write: KOPPERS COMPANY, INC., 8305 Scott St., Baltimore 3, Md.

KOPPERS Aeromaster Fans

Engineered Products Sold with *Service*

Check 1899 opposite last page

Rapid respirator clogging is halted by filtration of variable density

Deterioration during storage is no problem

Uses: Approved by Bureau of Mines for respiratory protection against all dusts not significantly more toxic than lead, pneumoconiosis-producing and nuisance mists, and chromic-acid mist.

Features: Relatively open structure of pre-filter and variable density in filter body prevent rapid clogging. Filter can be stored indefinitely without deterioration.

Description: Respiration filter is composed of two sections — pre-filter and filter body. Built-in pre-filter is composed of interlocked viscous fibers. It is thermally bonded to filter body. Relatively open structure results in large storage capacity for retained particles.

Filter body is composed of special combination of fine viscose and vinyon fibers and ultra-fine asbestos fibers. Viscose and vinyon fibers form constant latticework throughout filter body upon which asbestos fibers are deposited.

Asbestos fibers vary in density with heaviest concentration at innermost part of filter. This concentration gradient contributes to lack of rapid clogging of filter.

Filter is made to fit manufacturer's standard single- and twin-cartridge respirators. Breathing resistance is ½" of water at 85-liters-per-minute air flow; 300 filters weigh one oz.

(Red Devil respirator filter is product of Safety Products Division, American Optical Company, Southbridge, Mass.)

Check 1900 opposite last page.

Wood treatments and finishes for interior and exterior application are discussed in four-page brochure. Coverage data and specifications complete booklet. Bul BP2020—Building Products Division, L. Sonneborn Sons, Inc., 404 Fourth Ave., New York 16, New York.

Check 1901 opposite last page.

CELULOSA DE CHIHUAHUA, S.A., CHIHUAHUA, MEXICO • CIA DE LOS FABRICAS DE PAPEL, MEXICO CITY, MEXICO • INTERNATIONAL FERMONT MACHY. CO., TANINS REY—SAILLAT, **FRANCE** • NEW ZEALAND FOREST PRODUCTS, AUCKLAND, NEW ZEALAND • SOUTH AFRICAN PULP & PAPER IND., JOHANNESBURG, SOUTH AFRICA • CELULOSA DE CHIHUAHUA, S.A., CHIHUAHUA, CHI. MEXICO • [illegible] DE PAPEL PRETO Y PENE PABRE, S.A., VILLA OBREGON, D.F. **MEXICO** • PARSONS & WHITTEMORE INC., EXPORT TO **BRAZIL** • SOUTH AFRICAN PULP & PAPER LTD., JOHANNESBURG, **SOUTH AFRICA** • TECNICA CUBANA, S.A., HAVANA CUBA • UNION CORP. LTD., SOUTH AFRICAN PULP & PAPER IND., JOHANNESBURG, **SOUTH AFRICA** • CELLULOSA DE CHIHUAHUA, CHIHUAHUA, CHI. MEXICO • DORR-OLIVER INC., STAMFORD, **CONN.**, MINISTERIO DE MINAS, VENEZUELA • BADRENA & PEREZ, INC., HATO REY, PUERTO RICO • JOSEPH CROSFIELD & SONS, WARRINGTON, LANCASTER, ENGLAND • ANNIBAL R. DE MATTOS, RIO DE JANEIRO, BRAZIL • DISTILLERS CO. LTD., B. F. GOODRICH CO., BARRY, SOUTH WALES, ENGLAND • MONSANTO CHEM. CO., SPRINGFIELD ETINO QUIMICA-BARCELONA, **SPAIN** • SOCIETA IND. CHEMICHE EDISON, MILAN, **ITALY** • NEW ZEALAND CO-OP DAIRY CO., KIREFEHI, **NEW ZEALAND** • ESCUELA NACIONAL DE CIENCIAS UNIVERSIDAD NACIONAL AUTONOMA, MEXICO D. F. MEXICO • KONINKLIJKE, ZWAVELZUURFABRIEKEN, AMERSFOORT, HOLLAND • BORREGAARD CO. INC., SARPS BORG, **NORWAY** • CELANESE [illegible] CELULOSA MEXICANA, S.A., ZACAPU, MICHOACAN, MEXICO • OSCAR KOHORN & CO. LTD., N.Y., **EGYPT** • OSCAR KOHORN & CO. KROGER COMPANY, CINCINNATI, **OHIO** • THILMANY PULP & PAPER COMPANY, KAUKAUNA, **WISCONSIN** • NATIONAL POTASH, CARLSBAD, **NEW MEXICO** • E. R. SQUIBB & SONS NEW BRUNSWICK, **NEW JERSEY** • SPRINGS COTTON MILLS, LUMBERTON, **SOUTH CAROLINA** LTD., SAO PAULO SANTOS, BRAZIL • [illegible] MAC. SALT CO., ELWORTH, SANDBACK, CHESHIRE, LONDON, **ENGLAND** • [illegible], BRUSSELS, **BELGIUM** • ETS. A. BRUYAUX, BRUSSELS, BELGIUM • CALLAN, SIMON & NORTON INC., KYOWA FERMENTATION IND. LTD., TOZAI KOEKI KAISHA LTD., TOKYO, JAPAN • CELOREY, S.A. CALZADA DOLORES, APARTADO POSTAL 1738, MONTERREY, N. L. MEXICO • CELULOSA DE CHIHUAHUA S.A. CHIHUAHUA CHI. MEXICO • CHILEAN NITRATE SALES CORP., CIA. SALITRERA DE TARAPACA, IQUIQUE, **CHILE**, S.A. • COMPANHIA [illegible] SAO PAULO, **BRAZIL** • INDUSTRIA COLUMBIANA DE RAYON, BARRANQUILLA, **COLOMBIA** • OSCAR KOHORN, **CHILE** • N. V. KUNSTZIJDESPINNERIJ NYMA NIJMEGEN, HOLLAND • KJOWA FERMENTATION IND. LTD., TOKYO, **JAPAN** • THE NEW ZEALAND CO-OP DAIRY, WAHAVOA, NEW ZEALAND • NEW ZEALAND [illegible] COMPANY, MILANO, ITALY • SAID, S.A., QUILLOTA, CHILE • ABURDARVEN, H.F., (SINGMASTER & BREYERS), REYKJAVIK, **ICELAND** • ALGEMEEN [illegible] N.V., ARNHEM, HOLLAND • AMERICAN SMELTING & REFINING, CUBA, **CUBA** • OSCAR KOHORN & CO. LTD. NEW YORK, **EGYPT** • OSCAR KOHORN, SAO PAULO SANTOS, BRAZIL • KOPPEL ENGRG. LTD., AFRICAN EXPLOSIVES [illegible] D., MODDERFONTEIN, SOUTH AFRICA • RAYON CONSULTANTS INC., BARRANQUILLA, [illegible] OMBIA • SINGMASTER & BREYER, REYKJAVIK, **ICELAND** • SULFATO IMPERIAL CHEM. [illegible] & CO. LTD., AUSTRALIA • INCANDESCENT HEAT CO. LTD., CHAS. PFIZER & CO., BIRMINGHAM, ENGLAND • INCANDESCENT HEAT CO., SMETHWICK, BIRMINGHAM, ENGLAND, SCOTTISH [illegible] SCOTLAND • INCANDESCENT HEAT CO., SMETHWICK, BIRMINGHAM, ENGLAND, FISONS LTD., GRINSBY, LINCS, ENGLAND • INDUSTRIA RAYON CONSOLIDADA S.A., BARRANQUILLA, S.A. • **NEW ZEALAND** CO-OP DAIRY CO., WAHAROA, NEW ZEALAND • NEW ZEALAND CO-OP DAIRY CO., AWAMUTU, NEW ZEALAND • NEW ZEALAND CO-OP DAIRY CO. • NEW ZEALAND CO-OP DAIRY CO., WAHAVOA, NEW ZEALAND • SAID, S.A., QUILLOTA, CHILE • SALT CHEMICALS, INC. TARRYTOWN, N.Y., LIMA, **PERU** • COMPANIA SANSINENA, [illegible]., **ARGENTINA** • SHARPLES CORP. PHILA., **PA.** SO. GEORGIA, **AUSTRALIA** • SKENANDOA RAYON CORP. N. Y., NATIONAL [illegible] FORT BOMBAY, INDIA • SULFATO DE VIESSE, S.A., COAHUILA, MEXICO DE V[illegible] HUILA, MEXICO • [illegible] PRODUITS GERBERT, S.A., MORTSEL, ANTWERP [illegible] ABURDARVEN, KSMOVALL, H.F., REYKJAVIK, ICELAND • KUNST[illegible] N.V., ARNHEM, HOLLAND • ARTSELA, MEXICANA [illegible] ALVARO[illegible] EXICO • AUSTRALIAN PAPER MFG. LTD., MELBOURNE • AYOTLA TEXTIL, S.A., MEXICO D.F., MEXICO • CARRIER CORP., HONOLULU MEXICAN S.A., ZACA[illegible] MICHOACAN [illegible] DE CHIHUAHUA HUA, MEXICO • CENTU[illegible] RAYO[illegible] [illegible] CHILEAN NITRATE SALES CORP. N.Y., CIA SALITRERA DE T[illegible] [illegible] COMPANIA RADIONERA CUBANA, S.A., HAVANA **CUBA** • [illegible] AL[illegible]KA • MONBUSI, INC. ANDERS JAHRE [illegible] PAKISTAN, CHITTAGONG, **PAKISTAN** [illegible] **COLOMBIA** S.A. • COMPANIA POR[illegible] [illegible] CONSULTANTS INC., N.Y., INDUST[illegible] [illegible] RAYONICA CUBANA, S.A., HAVAN[illegible] [illegible] ETHYL CO., CHESHIR[illegible] [illegible] WITH AFRICAN PU[illegible] [illegible] CIONAL DE ME[illegible] [illegible] ITALY VON [illegible] [illegible] ULO SAN[illegible] [illegible] TE ED[illegible] [illegible] T

Swenson processing equipment means quality to our customers round the world

a qualidad SPRAY DRYERS

la qualité CRYSTALLIZERS

la Calidad EVAPORATORS

la qualita' PULP WASHERS

Send for your copy of the new full-color Bulletin SW 401, "Swenson Parallel Flow Spray Dryers." Write Swenson Evaporator Company, 15667 Lathrop Avenue, Harvey, Illinois.

75th year

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

SWENSON

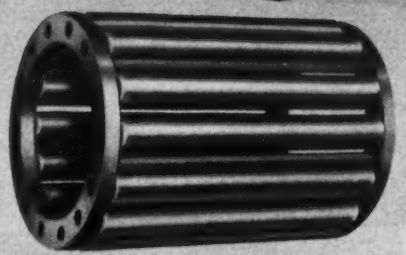
Proved Engineering for the Process Industries Since 1889

A Division of WHITING Corporation

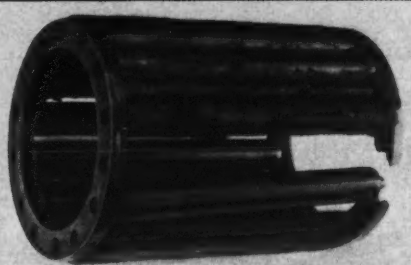
WHITING—MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY and RAILROAD EQUIPMENT

Check 1902 opposite last page

NOW! 1000°F. Lubrication with New Hi-Temp 2409



Houghton
Hi-Temp 2409



Conventional
High Temperature
Petroleum Grease

Bearing failure in high temperature processing equipment due to caking of carbon, de-composed thickeners, gums and resins at high temperatures can be prevented by the use of Houghton's new Hi-Temp 2409 grease!

Hi-Temp 2409 represents a completely new concept in high temperature lubrication. In this new grease, *the thickener provides the lubrication—not the fluid!* No silicones, diesters, soaps, heavy metals or solvents are used.

A clean-burning synthetic fluid is used as a carrier. The grease becomes fluid at 200°F. carrying the lubricant to all bearing surfaces. At 500°F. the synthetic carrier is completely evaporated and a soft film of dry lubricant remains on the bearing capable of withstanding temperatures well above 1000°F.!

If you have a high temperature lubrication problem, it will pay you to investigate this new grease—Hi-Temp 2409. Call your Houghton Man for a demonstration or write E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa., for your copy of Houghton's new booklet on "Thermal Lubrication".

HIGH TEMPERATURE LUBRICANTS

HI-TEMP 2409 GREASE
HI-TEMP 100, 200, 300 SERIES OILS
COSMOLUBE 101 and 102
HOT FORGING AGENTS
DIE CASTING LUBRICANTS
PORCELAIN MOULD AIDS

products of . . .

E. F. HOUGHTON & CO.
Ready to give you on-the-job service

Philadelphia, Pa. • Chicago, Ill.
Carrollton, Ga. • Detroit, Mich.
San Francisco, Calif. • Toronto, Canada

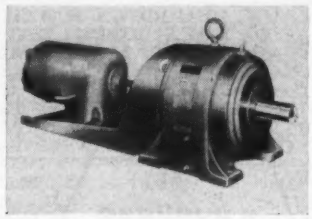
Check 1903 opposite last page

ENGINEERING & SAFETY

Gear-reducer combination has 4 or 8 speeds

Uses: Applications where more than one speed on output shaft of gear reducer is desirable.

Features: By moving shift lever on gearshift drive into one of four positions, four different output rpm values are obtainable. Use of two-speed motor in gearshift drive gives eight different speeds.



Combined gear reducer and gearshift-drive unit gives four output-shaft rpm values. Two-speed motor in gearshift drive would produce eight speeds

Description: Combination consists of gear reducer and gearshift-drive unit. Line includes double- and triple-gear-reduction units. Motors are rated from 1 to 10 hp.

Electrical characteristics are as follows: constant torque; 3 or 2 phase; 60 cy; 208, 220/440, or 550v. Special voltages and frequencies, along with mechanical modifications, are available. It is possible to furnish constant-hp output in all four speeds.

(Gear-reducer combinations are product of Lima Electric Motor Co., Inc., Subsidiary of Consolidated Diesel Electric Corporation, Lima, Ohio.)

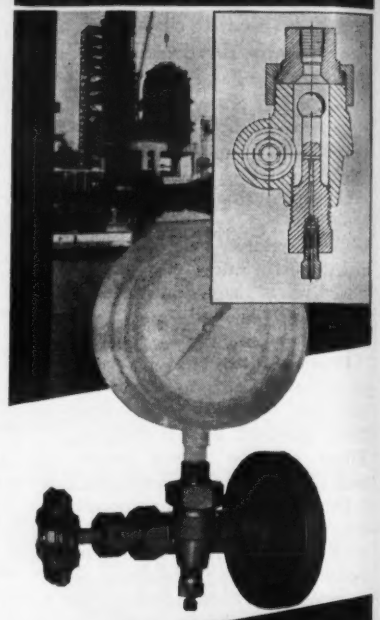
Check 1904 opposite last page.

Portable emergency lights are listed in eight-page Cat 12 — Electric Cord Company, 21 Spruce St., New York 38, N. Y.

Check 1905 opposite last page.

Electrical equipment maintenance is covered in 24-chapter, 650-page handbook. A chapter on maintenance of static controls is included. "Maintenance Hints" may be obtained by sending $2.00 direct to Westinghouse Electric Corporation, P.O. Box 2099, Pittsburgh 30, Pa.

Replaces the Block Valve Reduces Threaded Connections



New
Jerguson 66UVG VALVE
with
VERTICAL RISING BALL CHECK
for General Use

YOU can eliminate the usual block valve and greatly reduce the number of threaded connections when you use the new Jerguson 66UVG Valve for your instrument piping and other general use.

This new valve has the outlet offset 7/8" and has a vertical rising ball check on the downstream side of the seat. The vessel connection may be screwed, flanged, or for socket welding.

Threaded connections are reduced, for the valve combines unions, nipples, reducers, elbows, tees, valve and bleed valve into one space saving unit.

Valve has double seating stem for repacking under pressure, pressure bleeder valve and test gage connection, regrindable and renewable seats, union connection to gage, and many optional features and connections.

Write for drawing A-7952 and full information.

JERGUSON
Gages and Valves for the Observation of Liquids and Levels
JERGUSON GAGE & VALVE COMPANY
100 Adams Street, Burlington, Mass.
Offices in Major Cities
Jerguson Tress Gage & Valve Co., Ltd., London, Eng.
Pétrole Service, Paris, France

Check 1906 opposite last page

THAT'S INTERESTING

Bullock power

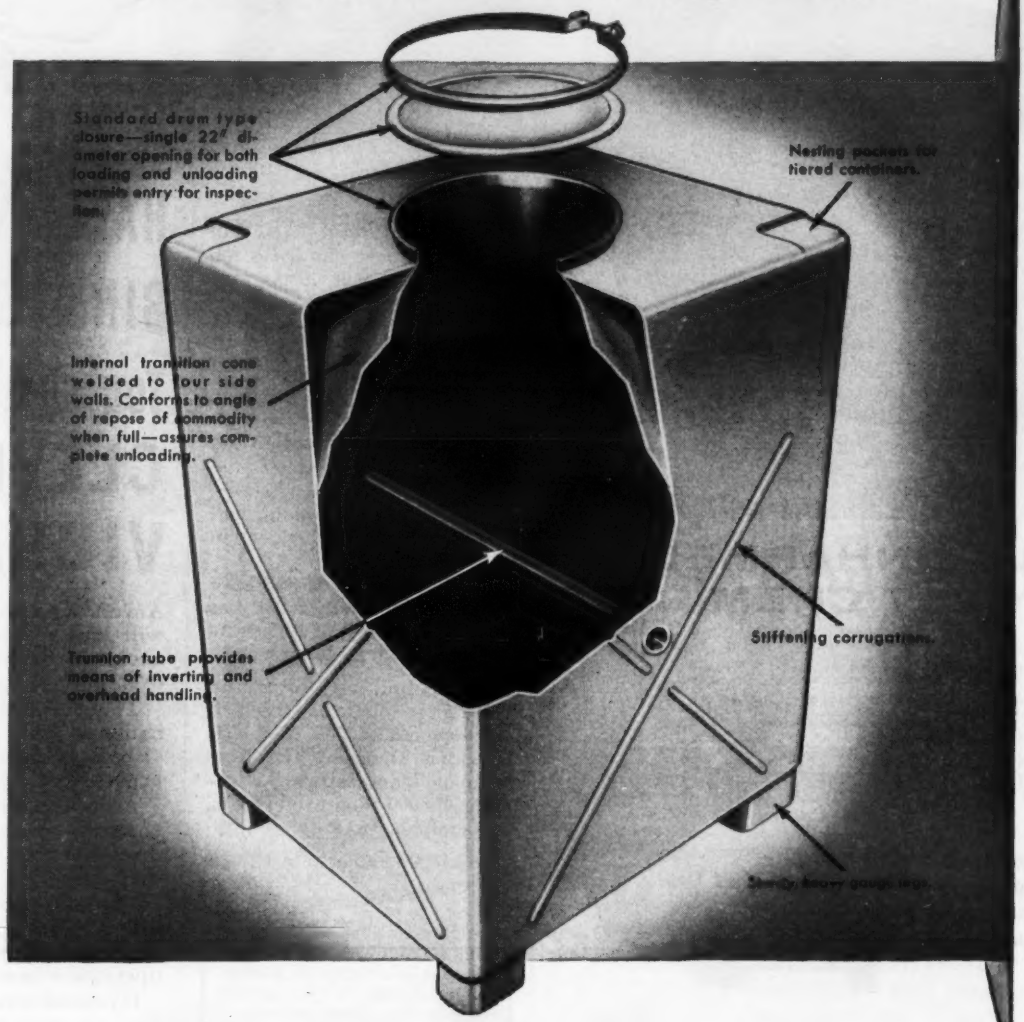
In India, bullocks (8) are being used to run a revolutionary (for rural India) new combination water pump-electric generator developed under a project sponsored by *Ford Foundation* and India's community development ministry. Unit triples amount of water pumped by ancient Persian wheel (100 gal/min). Generator produces 4½ kw. Pump irrigates 100 acres, delivers water for nearby villages.

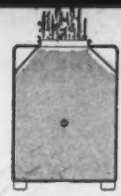
Cleaning up

Disposable paper wipers—like the ones you blow your nose in—are being used in decontamination work at nuclear plant at Shippingport, Pa. Plant has carried stock of *Scott Paper Co.* wipers since 1957—uses them for cleaning metal surfaces of reactor parts.

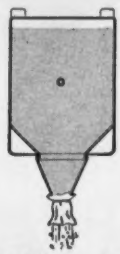
For more information on product at right, specify 1907 see information request blank opposite last page.

New Powell Invert-a-bin slashes bulk handling costs

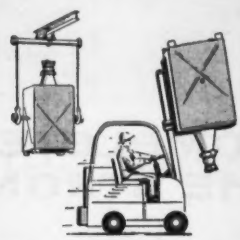

Standard drum type closure—single 22" diameter opening for both loading and unloading permits entry for inspection.
Nesting pockets for tiered containers.
Internal transition cone welded to four side walls. Conforms to angle of repose of commodity when full—assures complete unloading.
Trunnion tube provides means of inverting and overhead handling.
Stiffening corrugations.



Fills Fast—22" opening permits fast filling of even powdered materials. Internal cone conforms to angle of repose.

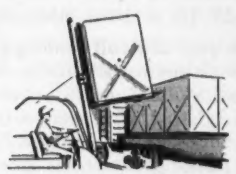


Empties Clean—Internal cone funnels all materials out of bin. No residue remaining.



Used Anywhere—Standard handling equipment—no fancy unloading devices needed at every use area.

Stores Outdoors—Weatherproof, turns yard area into warehouse. Stacks 2 high.



Cuts Shipping Costs—low cost flat-bed equipment considered part of special rail car with "freight free" advantages.

For bulk handling dry granular or powdered materials—sugar—flour—plastics—chemicals—cement—etc.—in plant or between plants, the new patented Powell Invert-A-Bin made of steel or aluminum is the simplest, most versatile container ever developed.

Easily filled, easily inverted, quickly emptied, the Invert-A-Bin can be used anywhere without special devices at each use point. It stores safely outside, lets you take advantage of many transportation economies. Invert-A-Bins eliminate the use of disposable packages and bring you all the advantages of a bulk handling system without the costly investment. Get all the facts—write today for your copy of the Invert-A-Bin, Semi-bulk handling brochure.

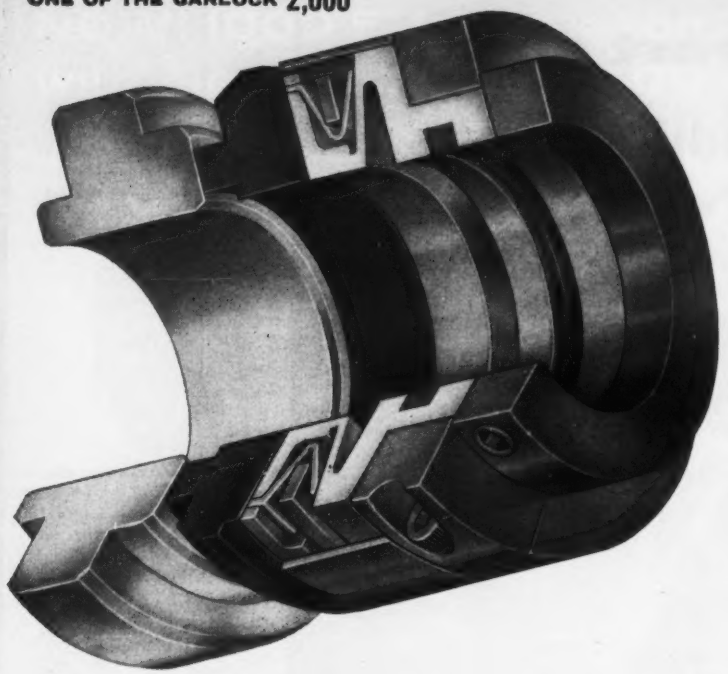
SEE US AT THE MATERIAL HANDLING EXPOSITION — BOOTH 706

POWELL PRESSED STEEL Since 1920 HUBBARD, OHIO

THE POWELL PRESSED STEEL COMPANY

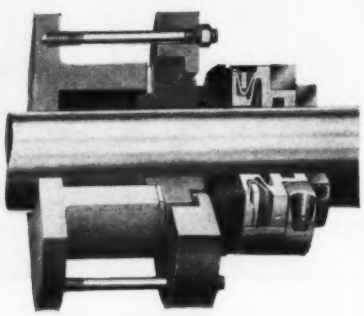
HUBBARD, OHIO

ONE OF THE GARLOCK 2,000



COMPLETELY UNHARMED BY THE STRONGEST CHEMICALS

Garlock Chemiseal Mechanical Seals have, through years of application, proved their ability to seal effectively against all chemicals . . . from the "easier" Methanol, Acetic and Propionic Acids to the more reactive Hydroxyacetic, Sulfuric, Adipic Acids and Hydrocarbon Slurry.



There are other benefits, too, that Chemiseals can add to your particular application. Consider these:

- LIFE EXPECTANCY MANY TIMES THAT OF OTHER SEALS
- NO SCORING ON SHAFTS
- AVAILABLE IN ALL SIZES
- EASY TO HANDLE AND INSTALL

Solve your difficult sealing problems. Apply Garlock Chemiseal Mechanical Seals against all media—including solids in suspension—in pressures to 100 psi at 75°C, or 75 psi at 100°C. Standard sizes to fit all pump shafts from 7/8" to 2 1/8"; special sizes also available. Chemiseal Mechanical Seals are another of the Garlock 2,000 . . . two thousand different types of gaskets, packings, and seals for every need. Discuss complete details with your local Garlock representative, or write for Catalog AD-164.

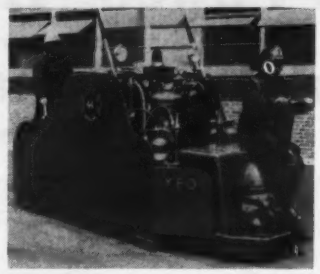
THE GARLOCK PACKING COMPANY, Palmyra, N. Y.
For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Molded and Extruded Rubber, Plastic Products

Canadian Division: The Garlock Packing Co. of Canada Ltd., Plastics Division: United States Gasket Company

Check 1908 opposite last page



Fire-fighting truck

. . . is second duty of low-lift platform truck. In case of emergency, truck picks up fire-fighting unit mounted on skid and proceeds to location of fire or explosion.

Unit was developed by manufacturer for use in their own plant and is not in production. It carries carbon-dioxide and dry-chemical fire-fighting systems. It also includes small tank of water and auxiliary hose for connection to local outlets.

Carrier for unit is 66" low-lift platform truck. Truck has 24v electrical system permitting speeds up to 10 mph.

(Fire-fighting unit for use on Worksaver platform truck is development of Yale Materials Handling Division, The Yale & Towne Manufacturing Company, 11,000 Roosevelt Blvd., Philadelphia 15, Pa.)

Check 1909 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Lubricating, sealing oil purified at 600 gph

Uses: Full purification of lubricating and sealing oil on high-vacuum pumps with oil circulating rate of 500 gph.

Features: Reclaimer uses two sets of inlet and outlet oil pumps. System is capable of handling 600 gph of vacuum-pump lubricating and sealing oil.

Description: Oil reclaimer incorporates duplex inlet

You should have
CLEVELAND
VIBRATORS

Anyone who stores materials in bins will find a vibrator an economic necessity. Bin vibrators completely overcome plugging and jamming.

The only substitute is a sledge hammer. This involves first, valuable man hours and secondly, expensive bin damage.

A bin vibrator will eliminate these costs. As a result, they will pay for themselves in a very short period of time, actually a matter of weeks.

The Cleveland Vibrator Company offers you complete engineering service on both air and electrically operated vibrators.

If you use bins, chutes, or hoppers you can save valuable dollars, by writing today for complete information and prices on Cleveland Bin Vibrators.

Dept. 5C, 2706 Clinton Ave.
Cleveland 13, Ohio

Check 1910 opposite last page

strainers, electrically heated vacuum vaporizer, and duplex fuller's earth filters in outlet line.

Centrally located graphic control panel has automatic electric controls and alarm system. Automatic recirculating system on vaporizer

Oil-reclaimer unit has duplex inlet strainers to protect pumps

permits only dry purified oil to be delivered to vacuum-pump charging system.

(600-X Hilco Hyflow Oil reclaimer is product of The Hilliard Corporation, Elmira, New York.)

Check 1911 opposite last page.

Circulation heaters in packaged units

Uses: Heating of oil and water in fuel-oil lines, heat exchangers, and all types of process equipment.

Features: Heaters are available as packaged units.

Description: Circulation-heater design eliminates return bends in heating tubes. Units are fully equipped with all-welded and insulated companion pipe assemblies.

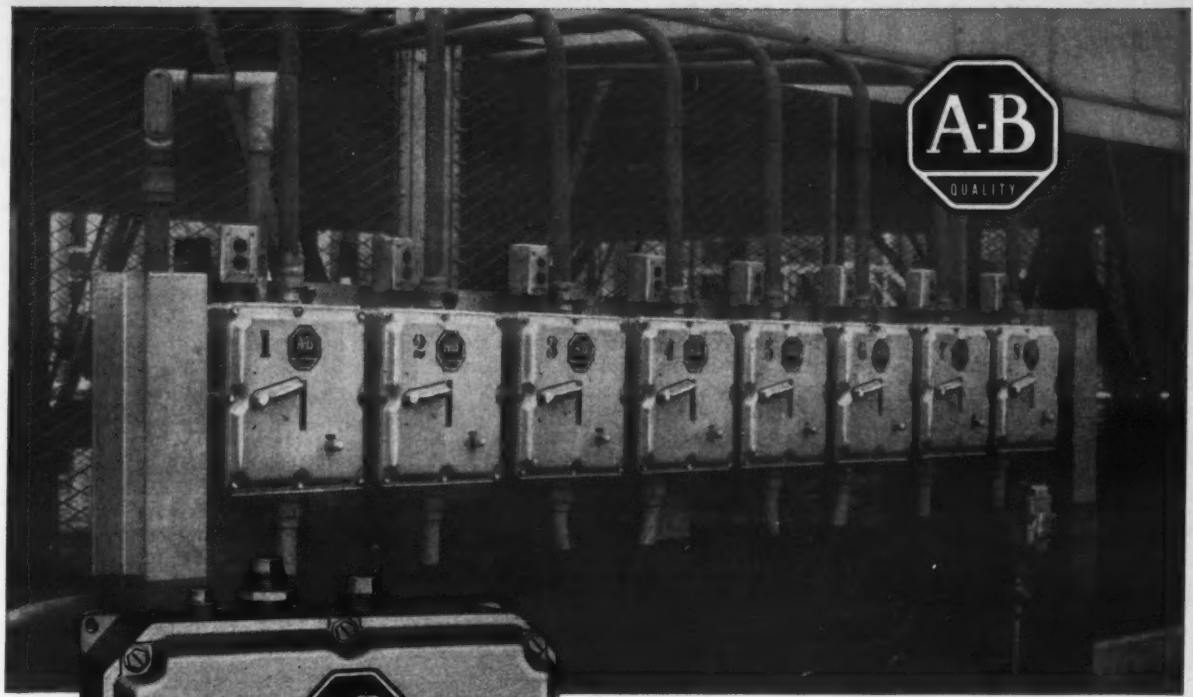
Indicating or non-indicating thermostats for high-temperature control up to 550°F are incorporated. Heaters are fitted with mounting tabs and mounted six-inch-square terminal box.

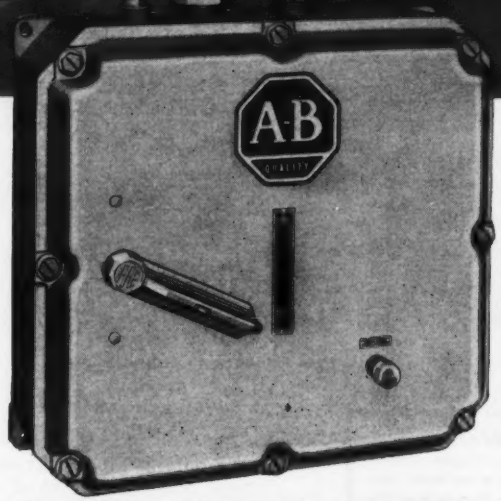
(Circulation heaters are product of Trent, Inc., 211 Leverington Ave., Philadelphia 27, Pa.)

Check 1912 opposite last page.

Canned pumps for handling volatile or toxic fluids are treated in Chempump Data Sheet — Chempump Corporation, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

Check 1913 opposite last page.





Bulletin 713 Combination Starter with circuit breaker in NEMA Type 9 enclosure for hazardous dust locations.

NEMA 7
For Hazardous Gas Locations

NEMA 4
Watertight Weatherproof

NEMA 8
For Corrosive Hazardous Gas

NEMA 11
Corrosion-proof

Round-the-clock safety . . . and reliability . . . without costly maintenance

When hazardous locations require starters in explosion-proof enclosures, it usually means costly maintenance. But *not* when you use A-B starters, because you eliminate the expense of removing and replacing bolted covers for "regular" inspection! In all A-B starters there is only ONE moving part. This is your assurance of *millions* of trouble free operations. There are no bearings to stick . . . no flexible jumpers to break. And the double break, silver alloy contacts never need servicing —they remain in perfect operating condition until completely worn away. The permanently accurate thermal overload relays are another "plus" feature. Insist on Allen-Bradley controls . . . and save on maintenance throughout the years.

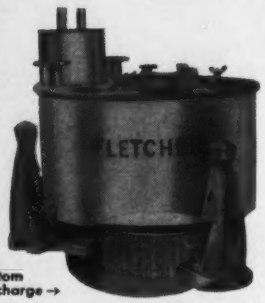
ALLEN-BRADLEY
Quality Motor Control

Allen-Bradley Co., 104 W. Greenfield Ave., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

Check 1914 opposite last page

Only FLETCHER *makes a* CENTRIFUGAL *for every purpose*

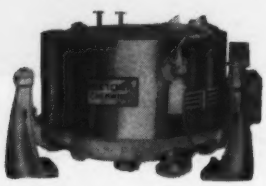
From the 48" basket tonnage production Tornado or Suspended down to the laboratory scale models, Fletcher has the centrifugal to solve your problem. These machines are fully automatic, have variable speeds and can be equipped with every type of drive—fluid mechanic, pneumatic or electric AC or DC.



Bottom Discharge →

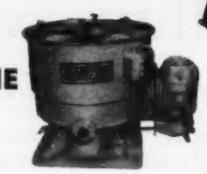
TORNADO
40" to 48" basket,
6.4 to 16 cu. ft.

SUSPENDED
20" to 48" basket,
1 to 16 cu. ft.



CHEMWIND
30" to 60" basket,
2.8 to 12½ cu. ft.

HURRICANE
20" to 36" basket,
.9 to 10 cu. ft.



CYCLONE
17" to 30" basket,
1.2 to 5.3 cu. ft.

LABORATORY MODELS for Pilot, .20 cu. ft. Rugged, compact machine combines functions of extractor, separator and clarifier. Results from this test unit can be accurately scaled up to production unit.

All Fletcher centrifugals can be made of carbon or stainless steel —and can be lined with lead, rubber or any acid-resisting material.

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NAME & TITLE

ADDRESS

COMPANY CITY & STATE

Check 1915 opposite last page

recent books

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

Epoxy Resins

The "how" and "why" of epoxy uses is a feature of this 293-page volume. This eighth of a series started in 1957 is authored by Irving Skeist, consultant, Skeist & Schwarz Laboratories, Inc., Newark, New Jersey. As with other books in the series it is semi-technical in nature, keeping in mind probable readers who do not have an extensive chemical background.

Book gives reasons behind each epoxy formulation to enable the reader to choose from the confusing and sometimes contradictory maze of available information. It also clarifies the puzzling array of trade names, and presents up-to-date formulations and manufacturing procedures.

A special chapter on epoxy coatings was written by George Somerville, coatings supervisor, Shell Chemical Company. Chapter on new developments is enhanced by a 298-entry bibliography.

To obtain "Epoxy Resins" remit $5.50 *direct to Reinhold Publishing Corp.,* 430 *Park Ave., New York* 22, *N.Y.*

Engineering Materials Handbook

Reviewed by
CONRAD BERENSON
American Cyanamid Company
Stamford, Connecticut

This 43-section, 2000-page book, edited by Charles L. Mantell, is the work of more than 150 contributors, each a specialist. Subject matter is quite comprehensive, covering metals, inorganic materials, organic materials, and prevention of failure.

Emphasis is placed upon fabricated forms of materials, their physical and mechanical properties, uses, limitations, advantages, and disadvantages. Data presented should be especially useful to those concerned with design and serviceability of processing equipment and plants.

While all of the sections will be of some interest to those in the chemical process industries, a few are particularly valuable. These are Organic Coatings; Insulation; Corrosion and Protection Against Corrosion; Pipe, Fittings, and Valves; and Gaskets, Packings, Adhesives, and Cements.

Although the treatment in most cases fulfills the objectives of the handbook, it must be borne in mind that these objectives cover just a limited area within each of the many fields discussed. Hence, the editor has included as the final section "Sources of Information on Engineering Materials," an excellent guide for those who require information beyond the scope of the handbook. Additional references are given within each of the many chapters.

The handbook is especially welcome at this time as it goes far in organizing and bringing into the proper perspective much recently amassed engineering data.

To obtain "Engineering Materials Handbook" remit $21.50 *direct to McGraw-Hill Book Company,* 330 *West* 42*nd St., New York* 36, *N.Y.*

Scale-up in Practice

This 134-page volume consists of a group of papers presented at the Sixth Annual All-Day Meeting of the Philadelphia-Wilmington Section of the American Institute of Chemical Engineers held in April 1958 at the University of Pennsylvania.

Edited by Richard Fleming,

Sun Oil Company, the book emphasizes practical information of primary use to younger engineers. Various phases of scale-up are covered, including theory, problems, economics, and recent developments.

Specifically, there are seven chapters, each consisting of an individual paper presented at the meeting. Titles are: 1) Use of Pilot Plants in Scale-up, 2) Scale-up Theory and Limitations, 3) Analog Approaches to Scale-up, 4) Pitfalls, 5) Process Economics, 6) Business Economics, and 7) Organizing for Scale-up. Audience discussions are included at end of each chapter.

To obtain "Scale-up in Practice" remit $4.50 *direct to Reinhold Publishing Corp., 430 Park Ave., N.Y. 22, N.Y.*

Stoichiometry for Chemical Engineers

Reviewed by
D. S. Davis
University of Alabama

In a chatty and informal style, Edwin T. Williams, Associate Professor of Chemical Engineering at Pennsylvania State University, and Dr. R. Curtis Johnson, Director of Scientific Computation, Compumatix, Inc., deal with an extended industrial stoichiometry in a thorough, informative, and admirable manner.

Generous with sample problems worked out in gratifying detail, the authors sieze every opportunity to cope helpfully with matters that have always troubled students: proper labeling of units, trial and error solutions, and logical approaches.

Use of all the book would require many to be well-prepared in some phases of physical chemistry and in several of the most important unit operations of chemical engineering. Any likely user of the text would profit by the excellent summaries of pertinent parts of these and other subjects that are introduced right where they do the most good. Throughout, the authors lead

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THE PEOPLE WHO KNOW AND CONTROL FLOW

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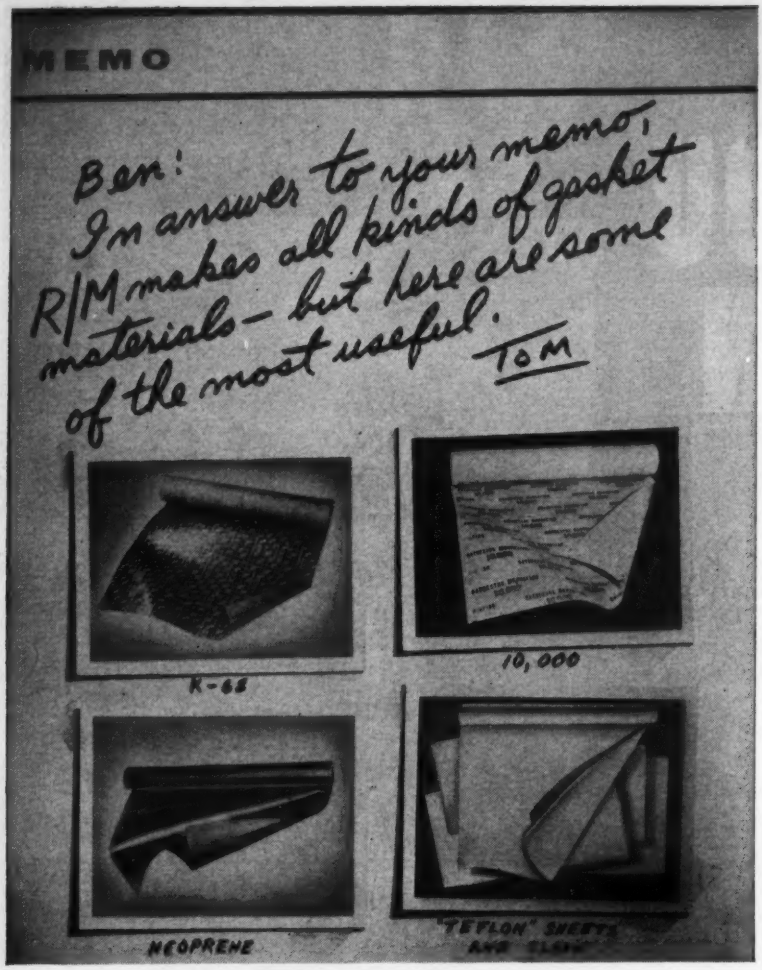

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RECENT BOOKS

the embryo engineer into thoughtful, careful methods of reasoning and calculation that will always stand him in good stead.

The 363 pages include an adequate index, 23 good appendices, 24 solutions to selected problems, and answers to 25 others of the 195 problems that appear, in all, in the six well-written chapters.

To obtain "Stoichiometry for Chemical Engineers" remit $8.00 direct to the McGraw-Hill Book Company, 330 West 42nd Street, New York 36, New York.

The Chemical Industry In Europe

This 203-page study deals with the situation of chemical companies in countries which are members of the Organisation for European Economic Co-operation. Prepared by the Chemical Products Committee, the study reviews 1957 and gives information on developments during the first half of 1958. Study is divided into three major parts and eight annexes (sections) which include, among other things, comprehensive tables on imports and exports of chemical products in 1957.

To obtain "The Chemical Industry in Europe," remit $2.50 to the O. E. E. C. Publications Office, 1346 Connecticut Ave., N. W., Washington 6, D. C.

Check 1918 opposite last page.

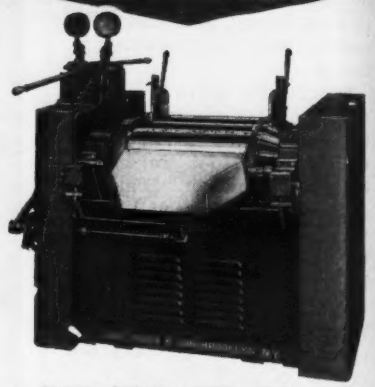
Punched Cards

Reviewed by
D. S. Davis
University of Alabama

In this 697-page second edition, Robert S. Casey, James W. Perry, Allen Kent and Madeline Berry have again competently assembled the best writing of thirty experts on punched card systems and their widespread applications.

Part I, Fundamental Machine Considerations, deals with hand-sorted punched

NEW ROSS HIGH SPEED THREE ROLL MILLS WITH – ONE POINT HYDRAULIC ROLL ADJUSTMENT



• Pressure indicating gauges provide greater ease in properly setting rolls, and less skill or experience is required by operator.

• Roll pressure settings can be recorded for exact reproduction of material assuring standardization of product.

• Special equalizers assure positive parallelism of roll faces at all times for uniform dispersions and minimum maintenance costs.

• Mills have quick roll release with safety overload feature, and are convertible for either fixed or floating center roll operation. 2½x5, 4½x10, 6x14, 9x24, 12x30, 14x32, and 16x40" sizes.

Production size dispersion type Change Can Mixers with– DOUBLE PLANETARY stirrer action.

• Stirrers with special blade angles and very close clearances revolve on their own axis and also around can, developing 12 intense compressive and shearing actions with each revolution to break down and disperse agglomerates.

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Area of can contacted by stirrers during only one revolution of stirrers around can (2 seconds). Position of stirrers advances 4½° with each successive revolution to sweep entire area and all points on sides of can. Stirrers overlap each other as well as center of can.

Write for further information!
CHARLES ROSS & SON COMPANY, INC.
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Check 1919 opposite last page

cards and commercially available equipment. Part II, Practical Applications, includes among other topics the use of punched-card techniques in preparing reports, tables, and books; the peek-a-boo system; a uniterm system; applications in the U. S. Patent Office; a Zatocoding information retrieval system; and the use of punched cards in linguistic analysis.

Part III, Fundamental Considerations in Coding and Systems Design, covers correlation of research data, mathematical analysis of coding, index searching, and transcription problems. Part IV, Future Possibilities, deals with evaluation of mechanized documentation and data processing machines. Part V is an annotated bibliography on the uses of punched cards.

Throughout, authors and editors are generous with detailed information and with photographs of many special punched cards and of much auxiliary equipment. Those about to employ these techniques will find authoritative and conveniently organized answers to their questions.

To obtain "Punched Cards: Their Applications to Science and Industry" remit $15 direct to Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y.

"Yes, Mr. Twits, the entire system is operating under full p-r-e-ss-ur-e!"

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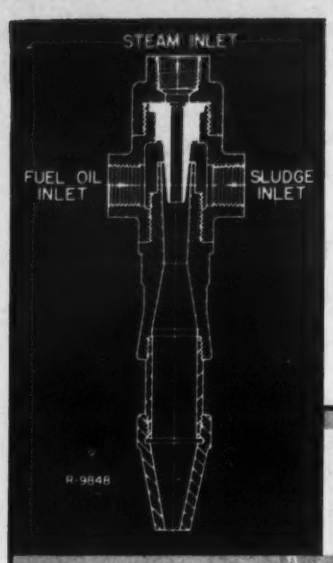

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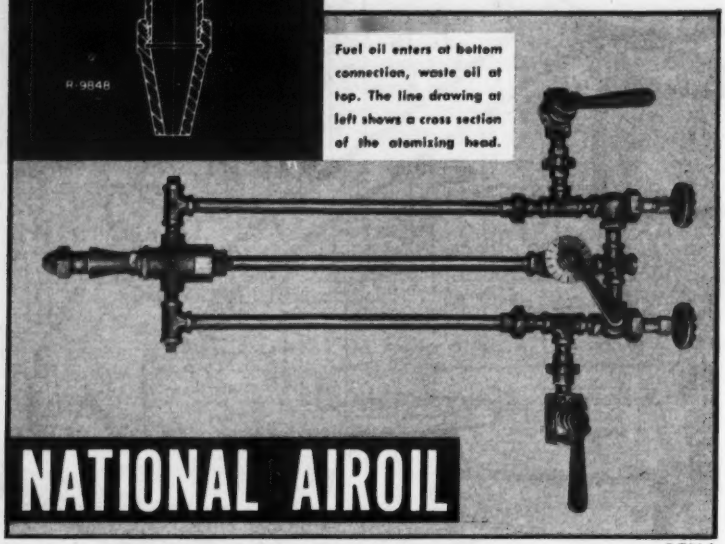
SLUDGES AND OIL WASTES

Fuel oil enters at bottom connection, waste oil at top. The line drawing at left shows a cross section of the atomizing head.



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Type S. A. D. Oil Burners are made standard in sizes 40, 80, and 120 U. S. gallons per hour. Larger sizes special.

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Check 1921 opposite last page

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheet, etc., are found throughout other sections of this magazine

Sulfuric acid from the consumer's viewpoint is comprehensively detailed in well-illustrated, 40-page booklet. In addition to a discussion of uses and distribution, selection of proper materials and safe methods for handling and storing acid at any concentration are given careful attention. Tables, charts, and nomographs which are most often needed by consumers comprise 20 pages. "Sulfuric Acid" — Chemicals Div., Olin Mathieson Chemical Corp., Baltimore 3, Md.

Check 1922 opposite last page.

Color test to quickly differentiate polyether from polyester-based urethane polymers is described in three-page technical bulletin, TIB 13-F5 — Mobay Chemical Company, 1815 Washington Rd., Pittsburgh 34, Pa.

Check 1923 opposite last page.

Pneumatic conveyor for car, truck, or bin unloading is described in four-page Bul 211—Sprout, Waldron & Co., Inc., Muncy, Pa.

Check 1924 opposite last page.

Flash-point recorder, continuous, is explained in four-page bulletin. Economies resulting from having flash-point information available promptly at scene of operations are detailed. Bul 702—Precision Scientific Development Co., Division of Precision Scientific Company, 3737 West Cortland St., Chicago 47, Ill.

Check 1925 opposite last page.

Stable isotopes — Reprint of paper presented at recent Geneva conference cites case histories of use of isotopes as tracers in various technical fields. "New Horizons for Stable Isotopes" — Isomet Corporation, Box 34, Palisades Park, New Jersey.

Check 1926 opposite last page.

Jib cranes designed for maximum hoist travel where minimum of overhead room is available are detailed in four-page bulletin. Available with capacities to three tons, cranes span to 20', and are designed for 180° rotation. "All-State Jib Cranes"—All-State Engineering Co., Inc., 7049 North 76th St., Milwaukee 8, Wis.

Check 1927 opposite last page.

Pressure instruments with corrosion-proof fiber-glass cases for indicating, recording, controlling and transmitting are described in five specification sheets. Specification Sheets 11-1451P-1 to 5—Fischer & Porter Co., 843 Jacksonville Rd., Hatboro, Pa.

Check 1928 opposite last page.

Industrial trucks are detailed in 20-page booklet. Included are full specifications. "Industrial Trucks Selector Guide" — Automatic Transportation Company, Division of The Yale & Towne Manufacturing Company, 149 W. 87th St., Chicago 21, Ill.

Check 1929 opposite last page.

Horizontal mixers with capacities up to 500 cu ft are reviewed in 12-page bulletin. Various arrangements available for working components are illustrated. Bul F-1058-33 — The Young Machinery Co., Inc., Muncy, Pa.

Check 1930 opposite last page.

Stainless steel guide is 159-page book which lists 3000 firms offering products or services pertaining to stainless. It contains 188 categories. "Buyers' Guide for Stainless Steel Products and Services" —The Committee of Stainless Steel Producers, American Iron and Steel Institute, 150 E. 42nd St., New York 17, N.Y.

Check 1931 opposite last page.

Cresylic acids are subject of brochure which describes complete line in detail. Cresylic Acid Brochure — Pitt-Consol Chemical Company, Subsidiary of Consolidation Coal Company, 191 Doremus Ave., Newark 5, N. J.

Check 1932 opposite last page.

PVC polymers and copolymers are described in 30-page brochure. Text is divided into four sections. First and second include technical specification sheets and application recommendations. Third section is concerned with compounds using company's polymers. Description of test methods used for resin evaluation comprises the last section. "Insular Vinyl Polymers and Copolymers" may be obtained from Rubber Corporation of America, Hicksville, N. Y.

Check 1933 opposite last page.

Temperature-measuring applications, more than 325 in number, are covered in four-page material guide. Chart is designed to aid thermowell users in selecting proper material for given application and operating condition. Chart is punched for use in three-ring binder. "Thermowell Material Guide" —Thermo Electric Co., Inc., Saddle Brook, N. J.

Check 1934 opposite last page.

Crushers varying in size from 9½ to 85½" are outlined in bulletin. Drive method, cavity design, tramp-iron protection, and self-aligning eccentric bearing are described in detail in Bul 58-D — Kennedy Van Saun Manufacturing & Engineering Corporation, 405 Park Avenue, New York 22, New York.

Check 1935 opposite last page.

Radioisotopic derivative method for quantitatively analyzing extremely minute substances in mixtures (up to 1/1 millionth of a gram) is discussed in 4-page bulletin. Bul #3 — Nuclear-Chicago Corporation, 223 West Erie Street, Chicago 10, Illinois.

Check 1936 opposite last page.

Magnetic separation and vibration equipment for wide variety of applications is tabulated in Separator and Vibrator Fact File — Eriez Mfg. Co., 73-SB Magnet Dr., Erie, Pennsylvania.

Check 1937 opposite last page.

Spectrophotometer which covers the ultraviolet, visible, and near-infrared wave-length regions is described in 16-page brochure. Also detailed are operating features, specifications, and applications, as well as illustrations of typical spectra obtained. Brochure on Model 4000-A may be obtained from Instrument Division, Perkin-Elmer Corp., Norwalk, Conn.

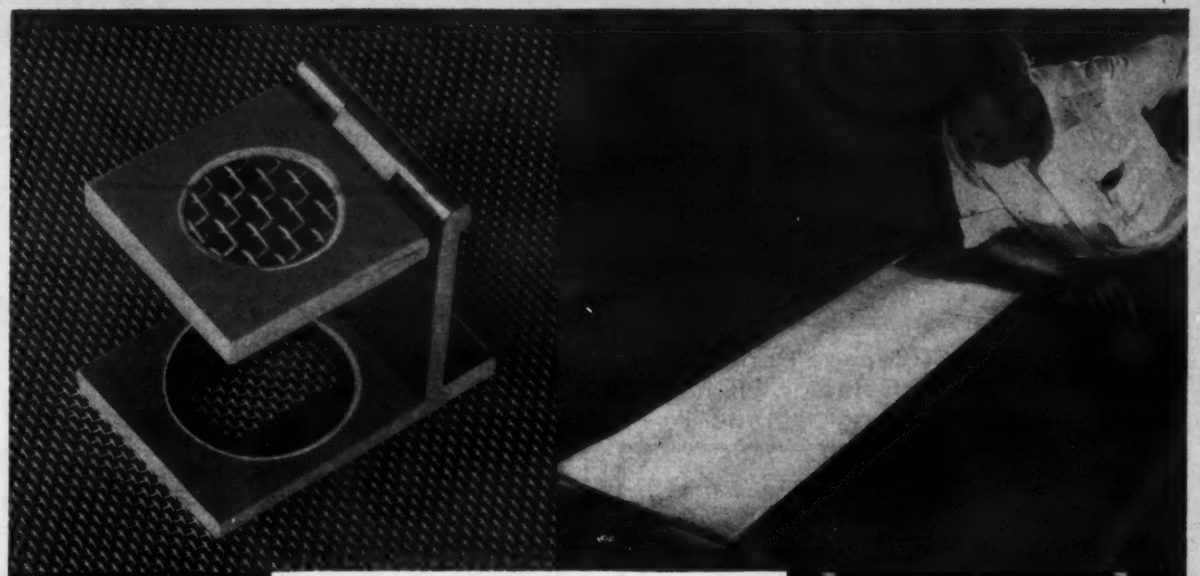
Check 1938 opposite last page.

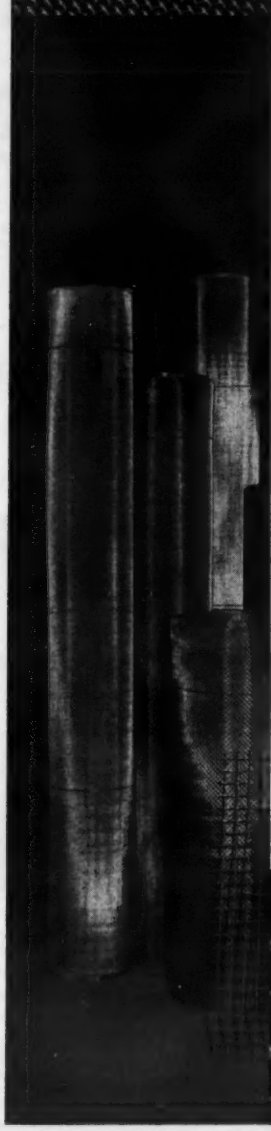
Tray deaerating heaters are subject of revised 12-page bulletin. Design features, accessory equipment and illustrations complete the booklet. Bul WC-106A— Graver Water Conditioning Co., Div. of Union Tank Car Company, 216 West 14th St., New York 11, N.Y.

Check 1939 opposite last page.

Rotator attachment for manufacturer's electric fork trucks is described in two-page circular. Going through 180° circle, device is adaptable to all kinds of dumping operations. Circular SP-1050— Lewis-Shepard Products Inc., 125 Walnut St., Watertown 72, Mass.

Check 1940 opposite last page.





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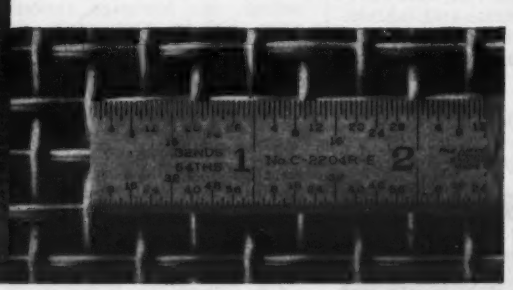
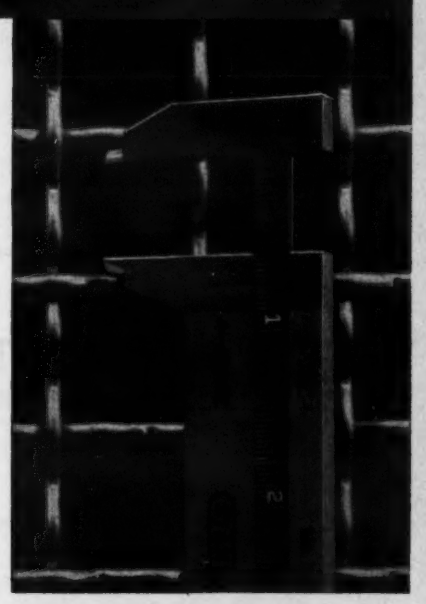
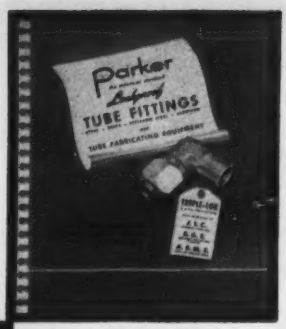
Manufacturers of Wire Cloth, Metal-Mesh Conveyor Belts, Wire Cloth Fabrications



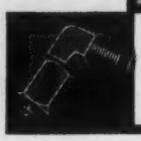


Check 1941 opposite last page

PROCESS LINES?



INSTRUMENT LINES?



This 128-page Parker Tube Fittings Selector will help you with your layouts

With the complete Parker Fittings Data Book, you can quickly select the correct type, shapes, alloys and sizes of tube fittings to handle any process or instrument fluid from low-pressure air to high-pressure steam, gases or liquids. Book fully describes all five types of Parker ferrous and non-ferrous Tube Fittings for use on metal or plastic lines from 1/16" to 2" diameter . . . "Intru-lok," "Triple-lok," "Ferulok," "Weld-lok," "Braze-lok."

For a copy of the Parker 4300 Catalog, call your Parker distributor, listed in the Yellow Pages. Or write to . . .

Parker FITTINGS AND HOSE DIVISION
17325 Euclid Avenue • Cleveland 12, Ohio
A DIVISION OF PARKER-HANNIFIN CORPORATION

Check 1942 opposite last page

ACCURATELY MEASURES LIQUIDS from *ACETONE* to *ASPHALT*

PETROMETER Remote Reading LIQUID LEVEL INDICATORS are accurate and reliable. Suitable for all stored industrial liquids . . in any tank . . . at any distance. Easy to install . . . and easy to read. Indicators have many unique design features.

write today for Bulletin 6004.

PETROMETER
CORPORATION
43-22 TENTH ST. LONG ISLAND CITY 1, N. Y.

Check 1943 opposite last page

NEW LITERATURE

Ventilators for removing gases, fumes, and stagnant air from tanks, manholes, and similar areas are detailed in Ventilator Literature — Coppus Engineering Corporation, 385 Park Ave., Worcester 2, Mass.

Check 1944 opposite last page.

Controlled-volume pumps for metering chemicals in minute volumes against pressures are detailed in four-page bulletin. Specifications on laboratory, industrial, and chromatographic designs are given. Bul 1257-1—Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pa.

Check 1945 opposite last page.

Pneumatic conveyors are subject of literature which includes application information — Fuller Company, Subsidiary of General American Transportation Corporation, 136 Bridge St., Catasauqua, Pennsylvania.

Check 1946 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Gas chromatography instrument which uses a detection method utilizing air as the carrier gas is described in four-page bulletin. Examples of possible ways of applying instrument are given. Bul 605 —Precision Scientific Development Company, Division of Precision Scientific Company, 3737 West Cortland St., Chicago 47, Ill.

Check 1947 opposite last page.

Truck casters and wheels are fully described in 192-page manual. Dimensional drawings and full specifications are included. Manual 65 — Darnell Corporation Ltd., 12000 Woodruff Ave., Downey, California.

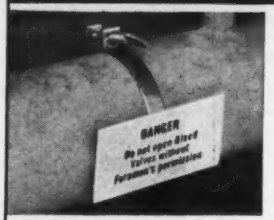
Check 1948 opposite last page.

Corrosive-fluid filters are described in four-page bulletin which includes photographs and charts. "Industrial Filters" — New Products Division, Corning Glass Works, Corning, N.Y.

Check 1949 opposite last page.

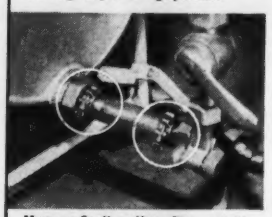
Fabrication facilities available for manufacturers of chemical equipment, atomic power, and gas, oil and mining industries are outlined in 8-page folder. Smithcraft Fabrication Div. booklet—Smithcraft Fabrication Div., A. L. Smith Iron Co., 200 Bent Street, Cambridge, Mass.

MARMAN for Dependability



Flagmaster identifies, instructs, gives warnings in processing systems.

Universal Flagmaster eliminates delays and mistakes, identifies lines. Made of corrosion resistant stainless steel, three sizes fit all pipes from 1" to 16⅛" O.D. Reusable.



Marman Sanitary Hose Clamps hold Tygon hose milk processing line.

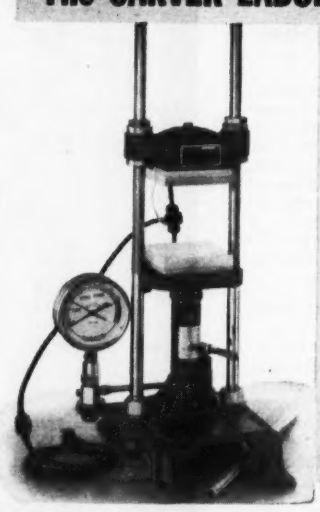
Sanitary Hose Clamps provide quick connection and disconnection of all types of processing hose. All stainless steel with choice of quick coupler or toggle latch. For 1¼" to 3½" hose.

Flagmaster is an Aeroquip Trademark

MARMAN DIVISION
Aeroquip Corporation
INDUSTRIAL SALES DEPARTMENT
11214 EXPOSITION BLVD., LOS ANGELES, CALIFORNIA
IN CANADA: AEROQUIP (CANADA) LTD., TORONTO 19, ONTARIO
Marman Products are Covered by U.S. and Foreign Patents and Other Patents Pending

Check 1950 opposite last page

The CARVER LABORATORY PRESS

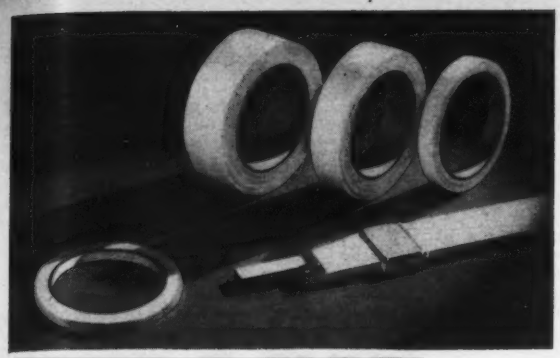


. . . Solutions for Pressing Problems

Accurately controlled pressures to 20,000 lbs.; 6-inch gauge mounted on base. Carver Standard Accessories include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment. Available from stock. Write for catalog.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
11 CHATHAM ROAD, SUMMIT, N. J.

Check 1951 opposite last page



TEMP-R-TAPE®

pressure-sensitive TEFLON* tapes for Class H & C insulation, non-stick or chemical resistant facing

Temp-R-Tapes, Teflon with a silicone polymer adhesive, provide dielectric strength up to 2750 v/m, low power factor, a temperature range of −100°F to 500°F (−75°C to 250°C) and a slippery, low friction or chemical resistant surface. Easy-to-apply, just press in place. Temp-R-Tapes are "called out" for many electrical and electronic insulating applications, aircraft and general industrial mechanical applications. 1/4" to 12" wide, .002" to .013" thick. From stock.

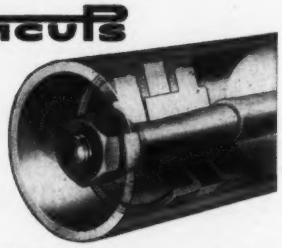
** du Pont T.M.*

FREE SAMPLE and data . . . *write, phone or use inquiry service.*

A PRODUCT OF CHR THE CONNECTICUT HARD RUBBER CO., NEW HAVEN 9, CONN.

Check 1952 opposite last page

KEEP EFFICIENCY HIGH with DARCOVA Pumcups



Pumcup designs include the conventional and 45° bevel types in a full range of sizes for all reciprocating pump and cylinder mechanism requirements.

A LOT of dollars go slipping right past the pistons of reciprocating pumps and cylinders that must be frequently repacked. But Darcova Pumcups keep pump efficiency *up*, hold slippage and maintenance *down!*

Because of Darcova's unique design, true texture engineering and precision manufacture, Pumcups outlast other packing at least 3 to 1.

Why not judge for yourself? Get all the facts. Send today for informative Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

DARCOVA THE ORIGINAL COMPRESSION CUP
TRADE MARK PUMCUPS

Check 1953 opposite last page

NEW LITERATURE

Detachable-container use in solving dust and waste disposal problem in a plant is told in four-page report. On-the-spot photos supplement case-history text. Bul LL-111558—Ingersoll Kalamazoo Division, Borg-Warner Corporation, 1810 N. Pitcher St., Kalamazoo, Mich.

Check 1954 opposite last page.

Bottling calculator, indicating ratio of bottle pressure to liquid temperature to gas volume may be obtained by letterhead request to Terris Div., Consolidated Siphon Supply Co., Inc., 22 Wooster St., New York 13, N. Y.

Amphoteric surface-active agents for industrial and cosmetic applications are treated in 32-page brochure. "Amphoteric Surface Active Agents" may be obtained from The Miranol Chemical Company, Inc., 277 Coit St., Irvington, N. J.

Check 1955 opposite last page.

Vibrating screen designed for handling dry or wet bulk materials is subject of 2-page data sheet. Specifications for two-single or double-deck models available with two different power rated drives are included. "Vibrating Screens" — Syntron Co., 110 Lexington Avenue, Homer City, Pa.

Check 1956 opposite last page.

Lift-truck drive which eliminates many conventional drive-train components to simplify operations are detailed in 12-page booklet. Booklet SP-24—Towmotor Corporation, 1226 East 152nd St., Cleveland 10, Ohio.

Check 1957 opposite last page.

Corrosion-resistant coatings are detailed in four-page bulletin which includes recommended uses and chemical resistance. Bul 100 — Carboline Company, 32 Hanley Industrial Court, St. Louis 17, Missouri.

Check 1958 opposite last page.

Polyurethane elastomer is detailed in 24-page brochure which contains many graphs and charts. A feature is a chart comparing material properties with other compounds. "Disogrin" — Disogrin Industries, Inc., 510 South Fulton Ave., Mount Vernon, N. Y.

Check 1959 opposite last page.

Clarifiers and thickeners for handling liquid-solids separation in water, sewage, and industrial waste treatment are described in 16-page bulletin. Three types of skimming mechanisms are discussed. Bul W-800 — Infilco Inc., Tucson, Ariz.

Check 1960 opposite last page.

CONTROLLED POURING

OF

ACIDS
CAUSTICS
PLASTICS
VISCOSE MATERIALS

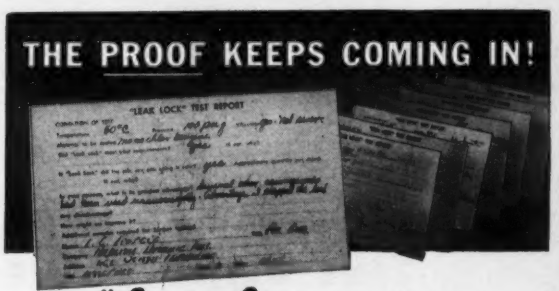
with the Model CP-1 Sterling Hydraulic Drum Lift. Be assured of self-locking and absolute control at any pouring angle.

Lifting capacity 750 lbs. Lifting height 72". For complete details and specification on the CP-1 model and other model Sterling Hydraulic Drum Lifts, write: Dept. CP5.

STERLING, FLEISCHMAN COMPANY
P. O. BOX 94 BROOMALL, PA.

Check 1961 opposite last page

THE PROOF KEEPS COMING IN!



"Leak Lock STOPS LEAKS WHERE OTHER JOINT SEALERS FAIL!"

Use *Leak Lock* to seal thread and flange joints... to keep bolts, nuts and plugs from loosening under the most rigorous usage. It's been job-proved in thousands of applications to give these advantages...

- **Withstands solvents that eat away other joint compounds.**
- **Remains flexible indefinitely ... joints won't freeze.**
- **Gives a tight seal under a wide range of temperatures, pressures.**
- **Does *not* heat spontaneously.**
- **Is unaffected by oil, gasoline, refrigerants, most gases and chemicals.**
- **Makes work easier... flows on and stays where applied.**

UL *Approved by Underwriters' Laboratories for gas, oil, propane and butane equipment.*

FREE SAMPLE—*Leak Lock* is available in handy tubes and in cans. Write on your letterhead for sample tube.

HIGHSIDE CHEMICALS INCORPORATED
16 COLFAX AVENUE • CLIFTON, N. J.

Check 1962 opposite last page

Absolute Line Shut-off

BY ONE MAN — IN ONE MINUTE!

HAMER *Visible Shut-off*

LINE BLIND VALVES

HAMER PLUG VALVES

Will not stick or freeze. Perfect for hard-to-hold fluids. Simple plug adjustment nut eliminates sticking

Hamer Line Blinds are unsurpassed for positive action, easy operation, long-life service and lasting safety. One man can open or blind a line in less than one minute, and there is nothing like a solid plate for a PERMANENT LEAKPROOF SHUT-OFF. Bar or handwheel operation eliminates wedges, hammers, wrenches needed for spreading conventional flanges. Removes fire hazard of sparking and stops damage to equipment.

Write for FREE catalog

Hamer ***VALVES INC.***

P. O. Box 1851
2919 Gardenia Ave., Long Beach 1, Calif.
Representatives throughout the World

#39-2

Check 1963 opposite last page

NEW LITERATURE

Plastics buyers will find up-to-the-minute data to aid them in their purchases in 64-page catalog. It contains individual sections in which most-commonly used and less-frequently used materials are grouped. Each of 12 sections is set off on contents page with a marker which identifies plastic types. Catalog may be obtained by writing on company letterhead to Morton French, general sales manager, Commercial Plastics & Supply Corp., 628-30 Broadway, New York 12, N. Y.

Forged-steel fittings are subject of 432 thumb-indexed pages featuring types and trims to meet severe fluid and gas handling duties at all temperatures and pressures. Cat F-10—Henry Vogt Machine Co., P.O. Box 1918, Louisville 1, Kentucky.

Check 1964 opposite last page.

Line of homogenizers are described in illustrated 12-page bulletin in which specifications are included. Information on component parts is also contained. Bul G-562—Dept. 962, Cherry-Burrell Corp., Cedar Rapids, Iowa.

Check 1965 opposite last page.

Ultrasonic cleaners in standard capacities from 1 to 75 gal and custom-made models in capacities up to 5000 gal are depicted in Ultrasonic Cleaner Literature — Acoustica Associates, Inc., 26 Windsor Ave., Mineola, N. Y.

Check 1966 opposite last page.

Belt conveyors—Four-page bulletin provides construction, installation, and operational details on slider-board belt conveyors. Bul 175-B—Sprout, Waldron & Co., Inc., Muncy, Pa.

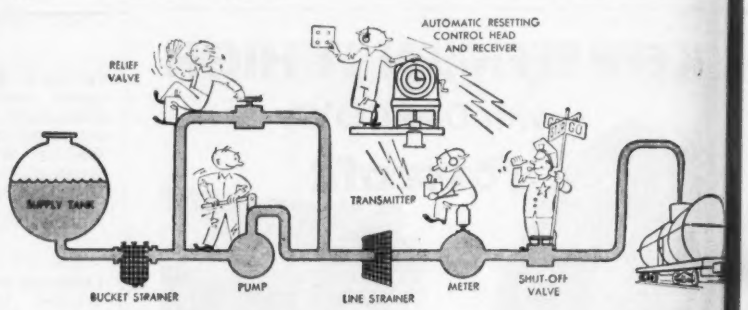
Check 1967 opposite last page.

Printing scales have their many features detailed in brochure. Unit provides full identification of printed weights. Form 2017a—Toledo Scale, Division of Toledo Scale Corporation, Toledo 13, Ohio.

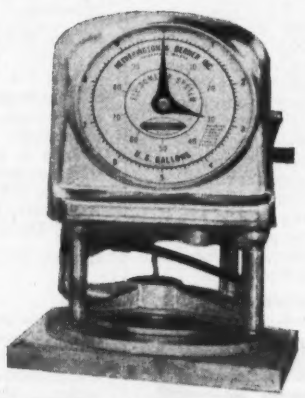
Check 1968 opposite last page.

Amino acids, laboratory reagents, rare sugars, and biochemicals are covered in 32-page catalog — Pfanstiehl Laboratories, Inc., 104 Lake View Ave., Waukegan, Ill.

Check 1969 opposite last page.



TYPICAL REMOTE CONTROL FLUIDOMETER SYSTEM



For Use Where Valves Must Be Located In Hard-to-get-to Places

This animated picture illustrates a typical remote control Fluidometer application. Remote control of this general type is recommended when plant conditions or arrangement make direct control impractical or impossible. With a system of this type the Fluidometer control head can be located away from the meter. Shown at the left is the automatic resetting control head, which controls the operation of the shut-off valve to give completely automatic batching. Available either jacketed or unjacketed—"tailor made" to fit your needs. Bulletin Fl-56 will be sent on request. For information on jacketed pipe and fittings write for Bulletin J-56.

HETHERINGTON & BERNER INC. · ***ENGINEERS-MANUFACTURERS***
710 KENTUCKY AVENUE **INDIANAPOLIS 7, INDIANA**

Check 1970 opposite last page

NEW LITERATURE

Antioxidants, bacteriostats, and other chemicals are discussed in 12-page booklet. Also described are themosetting and thermoplastic resins. Brochure covers company's plants and facilities. "Catalin—Chemicals, Resins, Plastics" may be obtained from Catalin Corporation of America, One Park Ave., New York 16, N.Y.

Check 1971 opposite last page.

Paper machine coaters are subject of 8-page bulletin. Drawings and specifications are included for five categories of coaters. Bul 360—The Black-Clawson Co., Dilts Div., Fulton, New York.

Check 1972 opposite last page.

Straddle truck has design features described in four-page brochure. M300E Straddle Truck Brochure — Hyster Co., 1003 Myers St., Danville, Ill.

Check 1973 opposite last page.

Pictorial presentation of company's capabilities in nuclear, chemical, electronic, missile, and other fields is theme of colorful 96-page booklet. Over 300 photos illustrate facilities and activities of firm's nine divisions in six plants. "Capabilities Illustrated" — Public Relations Department, Cook Electric Company, 2700 North Southport Avenue, Chicago 14, Illinois.

Dialysis system for separating acid, alkali, or salt liquors is described in 6-page brochure. Engineering drawings illustrating construction and operation are contained. Bul WC-121—Graver Water Conditioning, Div. of Union Tank Car Co., 216 West 14th Street, New York 11, N. Y.

Check 1974 opposite last page.

Industrial cleaning is discussed in 24-page booklet which traces the "evolution" of cleaning. "The Evolution of Cleaning through Technology"—Oakite Products, Inc., 118F Rector St., New York 6, New York.

Check 1975 opposite last page.

Conveyor-elevators are depicted in Cat 358 — Stephens-Adamson Mfg. Co., Ridgeway Ave., Aurora, Illinois.

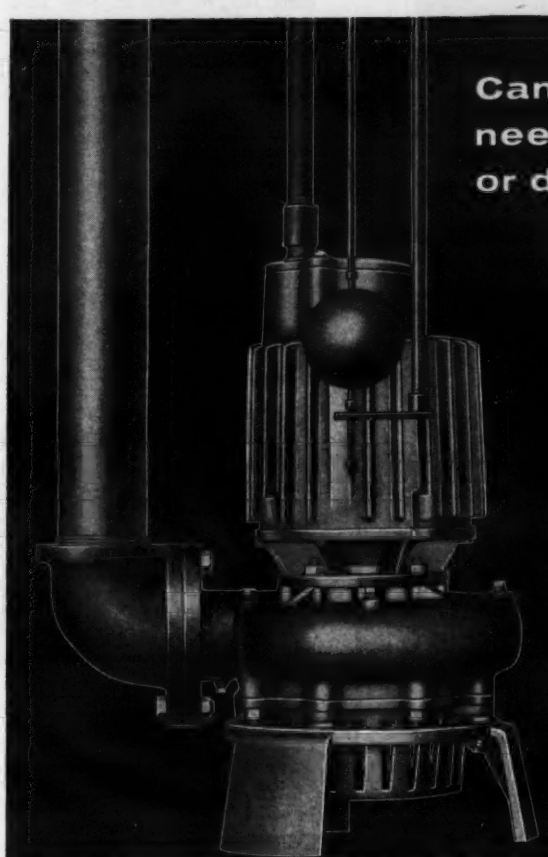
Check 1976 opposite last page.

Drum up-ender with clamping forks, for use with manufacturer's electric fork trucks, is shown in use in two-page circular. Photos and drawings reveal how device clamps, rotates, and dumps barrels, drums. "Drum Up-Ender"—Lewis-Shepard Products Inc., 125 Walnut St., Watertown 72, Mass.

Check 1977 opposite last page.

NEW...FOR INDUSTRIAL DRAINAGE

DEMING "DEMERSIBLE" SUMP PUMPS



Can be totally submerged without need of long support column or drive shaft

- **COMPACT:** Pump and motor are one unit. Lowers into pits with minimum effort.
- **VERSATILE:** "Demersibles" can be quickly removed and re-installed at any location to meet emergency requirements.
- **PUMP CONTROLS:** Can be positioned at any convenient location.
- **MOTOR:** Completely sealed to exclude moisture. Oil filled in cast iron case.

You'll want to know more about the ECONOMICAL "Demersible" Sump Pump. Send today for complete descriptive literature.

The DEMING Co.

507 BROADWAY • SALEM, OHIO

Send me Literature on the Deming "Demersible" Sump Pump

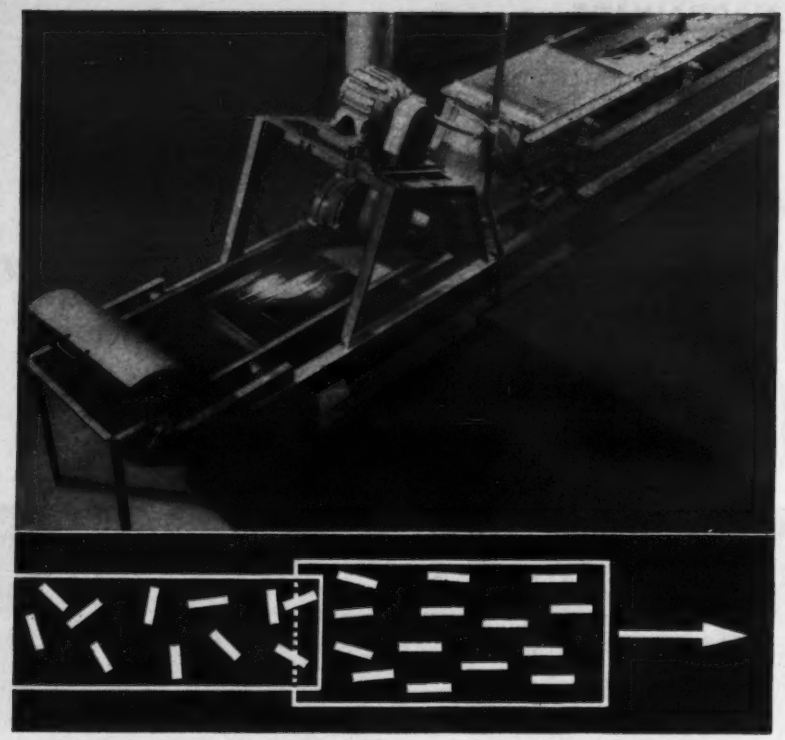
NAME_____

COMPANY_____ POSITION_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

Check 1978 opposite last page



AJAX VIBRATION ENGINEERING designs to your conditions. Sketch shows how machine sorts and aligns random-spaced materials for further processing. Facilities are maintained at AJAX for testing characteristics of your materials to suit individual requirements.

ANNOUNCING AJAX
Vibration Engineering Service

To help You Shake Down Your Costs of...

Handling, processing and conveying bulk, semi, and finished materials from foundry sand to food products and from talcum to gun powder. AJAX VIBRATION ENGINEERING offers a wealth of experience in putting vibration to work for the Who's Who of industry. You don't have to be BIG to cut your costs and improve your competitive position by taking advantage of its savings.

AJAX LO-VEYORS **Separate, Sort, Align, Process, Wash, Cool Dry, Clean, and Salvage as they Convey**

Learn how AJAX VIBRATION ENGINEERING makes it possible for one multi-purpose Lo-Veyor to perform several operations at the cost of a single machine. Phone or Write outlining your requirements and ask for this New Ajax Selection Guide which shows how vibration will shake down your costs.

AJAX

AJAX FLEXIBLE COUPLING CO. INC.
24 Portage Road, Westfield, N. Y.

Please send Ajax Lo-Veyor Selection Guide to

Name_____

Concern_____

Address_____

Check 1979 opposite last page

NEW LITERATURE

Metal hydride reducing systems used for selective reductions of organic compounds are reviewed in 28-page booklet. New techniques for increasing selective nature of chemical reductions by using complex metal hydrides with other reagents are covered. "The Mixed Hydrides" is available from Metal Hydrides Incorporated, Congress St., Beverly, Mass.

Check 1980 opposite last page.

Fluorine handling booklet of 24 pages tells how this corrosive chemical and its compounds can be successfully handled with nickel alloys. Bul 3369 B-141—The International Nickel Company, Inc., 67 Wall St., New York 5, New York.

Check 1981 opposite last page.

Temperature-measuring-recording device for recording gas chromatograph column or sample inlet temperature directly on recorder chart is described in Bul 752—Scientific and Process Instruments Division, Beckman Instruments, Inc., 2500 Fullerton Rd., Fullerton, Calif.

Check 1982 opposite last page.

Cyclone separators for catalyst recovery and other fluid bed operations are described and illustrated in 4-page bulletin. Bul C-2058—The Ducon Company, Inc., 147 East Second St., Mineola, L. I., New York.

Check 1983 opposite last page.

Lift trucks — Six-page brochure contains specifications, charts, drawings, and photographs of four high-lift, battery-powered hand trucks. Bul SS-953 — Industrial Truck Division, Clark Equipment Company, Battle Creek, Mich.

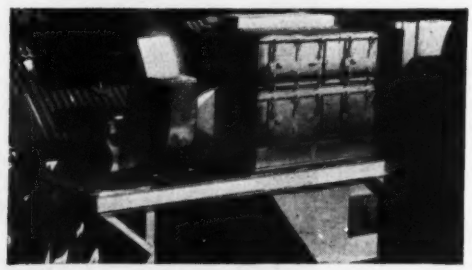
Check 1984 opposite last page.

Diaphragm valves for every type of pipe and how to select them make up six-page, two-color bulletin. Bul 115—Hills-McCanna Company, 4571 W. Touhy Ave., Chicago 46, Ill.

Check 1985 opposite last page.

Corrosive-resistant pumps and faucets are summarized in Corrosion-resistant Product Literature — Eco Engineering Company, 12 New York Ave., Newark 1, N. J.

Check 1986 opposite last page.



Barely visible discharge from exhauster in this unretouched photo shows how Dustex Miniature Cyclone Collector ended a problem for Perlite Products Co.—while recovering 70 lbs./hr. with no maintenance.

"95% PREDICTED EFFICIENCY PROVED..."

and Collector is maintenance-free!"

Frank W. Schaffer, President of Perlite* Products Co., Primos, Pa., writes this about his Dustex Miniature Cyclone Collector purchased on a basis of the Dustex Single Tube Determination test:

"Your predicted efficiencies of 95% are proven ...collecting 70 lbs./hr. of 85% below-325-mesh material at 450°F...complaints on discharge are ended, and the collector is maintenance-free."

**Perlite ... extremely lightweight material for insulation and filtration, with a bulk density as low as 3.5 lbs./cu. ft.*

Write Today for Dustex Bulletin "A Simplified Test Method" describing actual collection test at your plant at no obligation.

25 ANDERSON ROAD • BUFFALO 25, N.Y.

Dustex CORP.

Check 1987 opposite last page

Tantalum applications are summarized in four-page folder covering use of material in electronic, nuclear, chemical, and missile industries. Tables giving mechanical and physical properties of recently developed products are included in Tantalum-application Folder — National Research Corporation, 70 Memorial Drive, Cambridge 42, Mass.

Check 1988 opposite last page.

Health protection—summary of 10 years experience in beryllium facilities is subject of 58-page booklet. Bul HASL-36 may be obtained by remitting $1.75 directly to Office of Technical Service, U. S. Dept. of Commerce, Washington 25, D. C.

Phenolic resins, varnishes, and molding powders are described in eight-page illustrated brochure. Purpose is to aid designers, molders, fabricators, formulators, and end-users in specification of phenolic materials. Cat CDC-358—Chemical & Metallurgical Division, General Electric Company, One Plastics Ave., Pittsfield, Mass.

Check 1989 opposite last page.

Power lubrication equipment, fittings, and accessories for any machine that has a bearing surface which requires a lubricant are described in 32-page Cat 81—Lincoln Engineering Company, 5780 Natural Bridge Ave., St. Louis 20, Missouri.

Check 1990 opposite last page.

Plate-type heat exchangers are subject of 12-page booklet. Information on specialized equipment and heating systems for use with heat exchangers completes the literature. Bul G-560—Dept. 960, Cherry-Burrell Corp., Cedar Rapids, Iowa.

Check 1991 opposite last page.

Roller gravity conveyors—52-page reference book contains illustrations and photos explaining application of gravity conveyors and the more common accessories. "Roller Gravity by Lamson"—Lamson Corporation, Syracuse 1, New York.

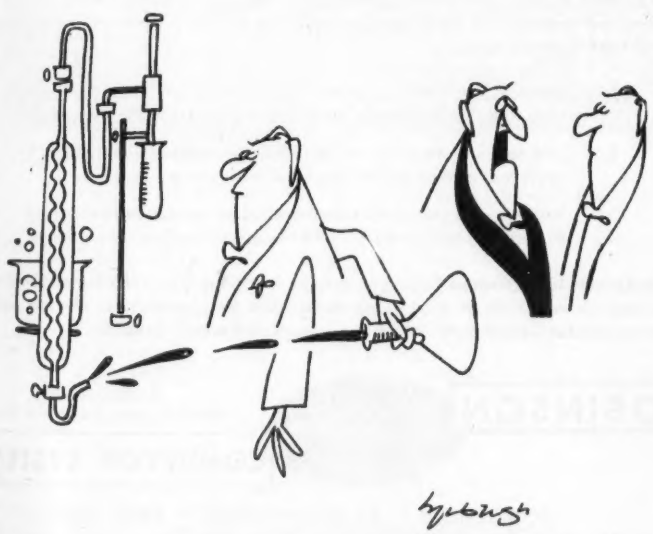
Check 1992 opposite last page.

Fittings for refrigeration, including valves, pipe nipples, flanges, and hanging fittings are illustrated and dimensioned in 56-page catalog. Eight pages of useful tables form latter portion. "Valves Fittings and Supplies"—Frick Company, Waynesboro, Pa.

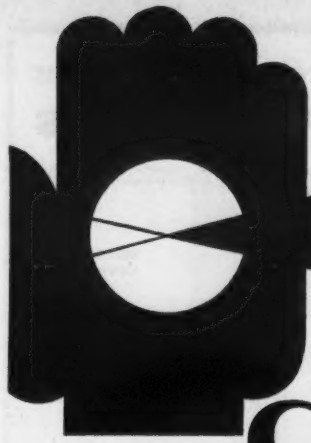
Check 1993 opposite last page.

Polyvinyl acetal resins are discussed in 32-page technical manual. Detailed outlines are given for physical properties of various resin grades. Insolubilizing reactions are described in separate section. Formulations and other data for suggested end-use applications are shown. Tech Manual BF-102—Department DD, Shawinigan Resins Corporation, Springfield 1, Massachusetts.

Check 1994 opposite last page.



"He's the greatest."

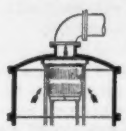


STOP Entrainment LOSSES

with

Centrifix®

SCRUBBERS • PURIFIERS • SEPARATORS

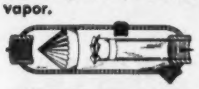


INTERNAL PURIFIER

Cleans vapor, increases evaporating capacity; for high velocities at low pressure; broad flow range.

SCRUBBER

Guaranteed to remove 99.5% or more of ALL solid or liquid entrainment—dust, fumes, sulfides, fly ash—in gas, air, steam or vapor.



LINE-TYPE SEPARATOR

Removes water from steam; increases heat transfer; removes water, sand, brine at well head; protects turbines, compressors; keeps compressed air lines free of oil and water. For any pipe size, horizontal or downflow use, any pressure, temperatures to metal tolerance.

1. **Increase Your Profits**—Get MORE production from your present equipment PLUS valuable by-products that help pay for this improvement.
2. **Removes 99.5%** or more of ALL solid or liquid entrainment—HIGHEST of all!—in any gas, air, steam or vapor regardless of density, chemical characteristics or size.
3. **Protects valuable capital equipment** from costly shutdowns and major overhaul.
4. **LOW first cost**—smaller size saves space; installs easily, quickly—saves time, labor, money. Needs no costly, cumbersome supporting structure!
5. **Cuts maintenance expense** — no expensive filters to replace or clean, no moving parts, non-clogging, self-cleaning. Only Centrifix has the patented helicoid tuyere!
6. **Improves product quality**—takes out the smallest, toughest "hidden" entrained particles, makes final product MORE valuable, turns WASTE into PROFIT!
7. **MINIMUM pressure drop** regardless of flow rate, temperature or pressure due to Centrifix's patented helicoid tuyere!
8. **Purifies** with NO heat loss, uses no wetting agent!
9. **Complete Engineering Service** to survey and solve your particular entrainment problem.
10. **Custom-Engineered** to the exact requirements of pressure, flow rate, temperature and characteristics of the flowing medium and entrainment.

WRITE or WIRE TODAY! AA-9548

FOR THE FINEST IN PURIFYING EQUIPMENT FOR STEAM • VAPOR • GAS • AIR

Centrifix® CORPORATION

3608 PAYNE AVENUE

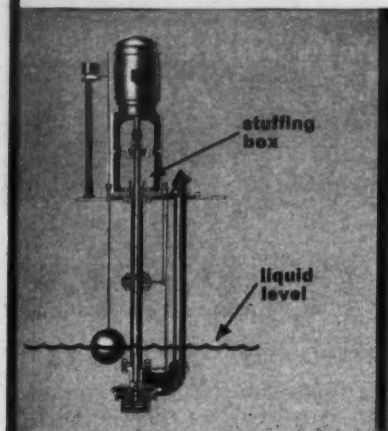
CLEVELAND 14, OHIO

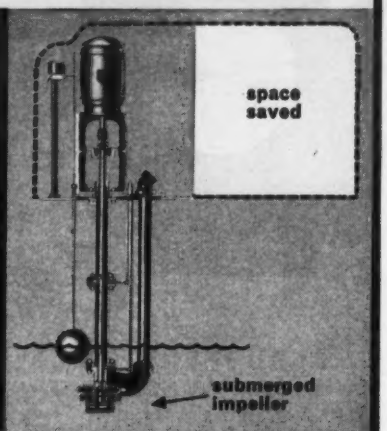
All Centrifix equipment is protected by U. S. Letters Patent & Patents Pending

Check 1995 opposite last page

you stop leakage, save space, and cut costs with Yeomans

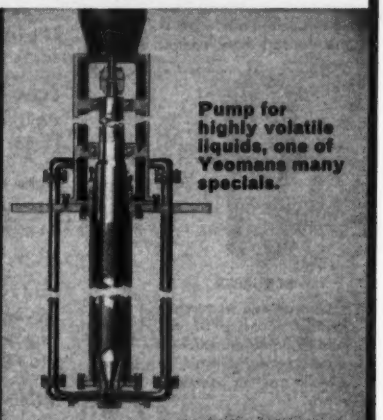
VERTICAL WET PIT PUMPS





ELIMINATE LEAKAGE. Stuffing boxes and seals are not under liquid pressure. With the Yeomans Vertical Wet Pit Pump there are no costly, annoying, or dangerous liquid leaks, as with horizontal pumps.

SAVE FLOOR SPACE. They use less than half the space required by horizontal pumps. Also, no priming equipment is needed as with suction lift horizontals. Impellers are submerged in the liquid ready for service.



CUT MAINTENANCE COSTS. With exclusive Lubri-vac® bearings are kept free of abrasive matter. Lubricant pressure prevents fluids from working into bearings. Result: Bearing failures are 90% less than with conventional vertical wet pit pumps.

SPECIAL DESIGNS. 59 Years of experience has enabled Yeomans to develop many excellent special designs for pumping "problem materials." All pumps can be furnished with ferrous and nonferrous alloy parts as required. *Capacity range from 5 to 10,000 g.p.m.*

YEOMANS

Manufacturers of: pumps for drainage • sewage • condensation return • water supply and circulation • equipment for treatment of domestic and industrial wastes.

SINCE 1898

Yeomans, 2003-5 N. Ruby Street, Melrose Park, Illinois

Please send me the catalog on Yeomans Heavy-Duty Vertical Wet Pit Pumps for...

☐ solids-free liquids

☐ solids-bearing liquids

*name*_____

*company*_____

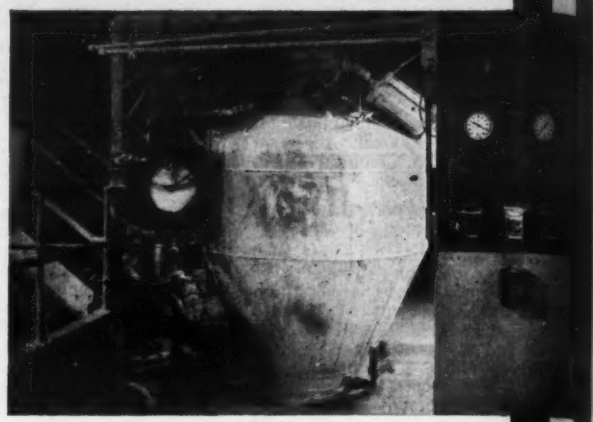
*street*_____

*city*_____ *zone*____ *state*_____

P-5916

Check 1996 opposite last page

Difficult Bulk Handling Job



...but well-handled by the

Robinson Air-Activated Conveyor

Product... abrasive chemical, ¼" to fine dust
Temperature... 600° F.

This Robinson Air-Activated Conveyor is installed in the plant of a well-known chemical company where it is conveying the hot chemical noted above . . . a job on which other means of handling, including pneumatic, either failed or proved inadequate.

Robinson operations can be made fully automatic and closely controlled by precise instrumentation.

The Robinson System—completely pneumatic, with gravity feed—offers several outstanding advantages for handling fine granular or dry powdered materials into, through and from the plant.

1 . . . products are handled gently; the mixture is 'fluidized'; particles are floated rather than blasted through the conveyor.

2 . . . only low volume of air is required; the average is less than 1 cubic foot of free air per pound of material conveyed.

3 . . . maintenance costs are exceptionally low; no moving parts such as motors, screws, shafts and bearings to require maintenance.

The Robinson Air-Activated Conveyor may be just what you need for pneumatically handling the materials at your plant. Investigate its possibilities. We can point to many successful installations. Write us in detail about your problem.

ROBINSON Air-Activated **CONVEYOR SYSTEMS**

A Division of Morse Boulger Destructor Co.

DEPARTMENT T, 80 FIFTH AVENUE • NEW YORK 11, N. Y.

Representatives in Principal Cities

Check 1997 opposite last page

Got a STRAINER PROBLEM?

LET MULTI-METAL HELP SOLVE IT

Multi-Metal designs and fabricates **STRAINERS TO YOUR EXACT NEEDS**—of any metal—from the size of a thimble to cylinders several feet long—as elements only or complete with housings.

- Whether you want to strain slurries of 2000 cps. or 1 cp., at 1 gpm or 20 gpm. — — —
- Multi-Metal-designed strainers can remove particles as small as 10 microns and still keep pressure drop to a minimum.
- There is no limit to design. Where time is important, Multi-Metal's quick opening cover can be furnished.

Get our recommendations on your next strainer problem.

MULTI-METAL WIRE CLOTH CO., Inc.

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Check 1998 opposite last page

here is the world's smallest and simplest strip chart recorder!

- AMPLE STORAGE: Contains 63-ft. chart roll, or 31 days' recording at one inch per hour. Useful chart width 2⅝".
- ACCURATE: Galvanometer pointer swings free for maximum accuracy, being clamped briefly for marking.
- INKLESS: Recording process is completely dry, utilizing special pressure sensitive paper. Method provides remarkable definition.
- RECTILINEAR: Advanced design provides true rectilinear recording free from distortion.
- RELIABLE: Positive synchronous motor drive with sprocket engaging holes in paper for accurate time indication.
- VERSATILE: Portable or panel mounting models. Stocked in a variety of scales and chart speeds.

WRITE TODAY FOR LITERATURE

*Subject to change without notice.

rust industrial co., inc.

130 Silver Street, Manchester, N. H.

Check 1999 opposite last page

NEW LITERATURE

Variable-pitch sheaves for low cost, stepless speed control are subject of six-page bulletin. Dimensions and specifications for sprocket adjustment type are included. Bul 20B7897B—Allis-Chalmers, Milwaukee 1, Wis.

Check 2000 opposite last page.

Lift trucks — Four-page bulletin gives complete engineering data and specifications on turning radius, ramp clearance, and dimensions of low-lift pallet truck. Bul 587 — Barrett-Cravens Co., 628 Dundee Rd., Northbrook, Ill.

Check 2001 opposite last page.

Feed control that electronically regulates flow of material through hammer mills is described in two-page bulletin. Series 10 Hammermill—Schutte Pulverizer Co., Inc., 878 Bailey Ave., Buffalo 6, N.Y.

Check 2002 opposite last page.

Metering pumps — manufacturer's new line, are pictured and described in 6-page bulletin. Streamlined units can handle from fraction of gal up to 1030 gal feed per hr. Bul 900 — Hills-McCanna Company, 4600 West Touhy Avenue, Chicago 46, Illinois.

Check 2003 opposite last page.

Reagent chemicals, indicators, stains and culture media, and solutions in greatest demand from laboratories are alphabetized in 36-page catalog. Cat R-59—Central Scientific Company, 1700 Irving Park Rd., Chicago 13, Ill.

Check 2004 opposite last page.

Flow-rate transmitter design features are described in 12-page bulletin. Illustrations and an actual reproduction showing plotted calibration data and relationship in size to sensing cam are features. Bul 170—Brooks Rotameter Company, PO Box 432, Lansdale, Pa.

Check 2005 opposite last page.

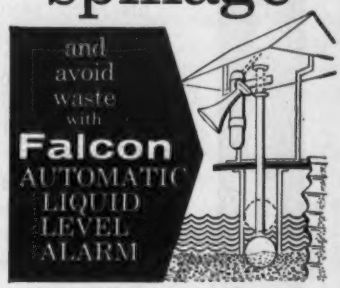
Laboratory chemicals are described in 336-page catalog. Information is provided on approximately 6500 organic and inorganic chemicals, solutions for analytical use, indicators, microscopical stains, resins, dyes, etc. British Drug Houses Catalog—The Ealing Corporation, 40 University Rd., Cambridge 38, Mass.

Check 2006 opposite last page.

Vertical conveyors to tie together horizontal floor conveyors in multi-floor building, making an integrated system, are described in four-page Bul 205 — Lamson Corporation, Syracuse 1, N. Y.

Check 2007 opposite last page.

prevent HAZARDOUS spillage



"Blue Chip" petroleum and chemical firms now are installing this unit to prevent wasteful, always expensive and often dangerous tank overflow in refineries, plants, bulk stations, transportation and other liquid-handling operations.

Falcon Liquid Level Alarms are—
● Non-Electric ● Non-Pneumatic ● Self-Contained ● Inexpensive ● Audible Up to ½-Mile or More. ● Easily Installed on Existing Equipment

save your voice

with the **Falcon Chief** and save money, too!

speak as you normally would—be clearly heard and understood up to ½-mile away!

Unique transistorized power megaphone—an instrument you will be proud to own. Gives up to 6,000 two-second amplified messages from standard replaceable battery. Light (3¼ lbs.)—easy to handle and use. Attractive red and gray polyethylene—built for abuse. Attractively priced for you, too!

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Summit, N. J. Dept. CPR

Kindly furnish complete data about your "Sounds for Safety" products.

We are especially interested in your:

☐ Fire Detectors & Systems ☐ Power Megaphone
☐ Warning Horns & Systems ☐ Liquid Level Alarms

Name .....
Company .....
Address .....

Check 2008 opposite last page

The Problem of Oil Vapor

. . . and how to solve it!

Chemical and pharmaceutical manufacturers, petroleum refiners, food processors and users of pneumatic instrumentation . . . all encounter critical procedures wherein hydrocarbon vapor in compressed air and process gas streams produces adverse results.

Typical Vape-Sorber uses include:

- **Aeration and agitation of liquids**
- **Air-cleaning of containers**
- **Protection of desiccants for dehydration**

The Selas Vape-Sorber, effectively combining principles of liquid-gas separation and high capacity oil adsorption, completely removes hydrocarbon vapors, dirt and liquid-phase entrainment of every kind. Its compact, welded steel construction contains no moving parts, requires minimum maintenance.

Send for your free copy of this new Vape-Sorber booklet No. 145. It describes, by chart and table, the exact size and model for your requirements.

SELAS VAPE-SORBER

Vape-Sorber is a registered trade name of Selas Corporation of America.

SELAS CORPORATION OF AMERICA | DRESHER, PENNSYLVANIA

Check 2009 opposite last page

MAISCH

METERING PUMPS

- **STAINLESS STEEL — OILLESS BEARINGS — STERILIZABLE**
- **POSITIVE DISPLACEMENT — SMOOTH, NON-PULSATING FLOW**
- **FOR HOT, COLD, VISCOUS OR WATERY FLUIDS**
- **ACCURATE WITHIN 1 TO 2%**

Maisch Metering Pumps are simple in design, ruggedly built for long service, and can be depended on to maintain accuracy indefinitely. Exclusive design features insure optimum performance. Particularly suited for handling chemicals, syrups, oils, glue, processing solutions, etc. Quick demountable or fixed heads. Fixed capacity pumps available in wide range of output. Pumps in stock for immediate delivery. Write for complete details and prices.

MECHANICAL PRODUCTS CORPORATION
1722 West Hubbard Street • Chicago 22, Illinois

Check 2010 opposite last page

NEW LITERATURE

Uranium-aluminum fuel elements and how they are produced are depicted in 4-page bulletin. Flow diagram illustrates various steps involved. Bul NU-3—M & C Nuclear, Inc., P. O. Box 898, Attleboro, Massachusetts.

Check 2011 opposite last page.

Fork-truck power attachment is described in four-page bulletin. Includes information on performance, maneuverability, and design and engineering features. Cat HJ 59—Materials-Handling Division, The American Pulley Company, 4200 Wissahickon Ave., Philadelphia 29, Pa.

Check 2012 opposite last page.

Industrial burners for firing boilers or other heat exchanger equipment are illustrated in four-color, 8-page bulletin. Specifications complete the brochure. Bul 1255—Orr & Sembower, Inc., Box 1138, Reading, Pa.

Check 2013 opposite last page.

Pressure recorder with circular chart and a recording controller with range from 30" Hg vacuum to 5000 psig are written up in two technical bulletins of two pages each. Tech Buls 11-1102P-1 and 11-1102P-2 — Fischer & Porter Co., 844 Jacksonville Rd., Hatboro, Pa.

Check 2014 opposite last page.

Magnetic separator of the induced-roll type is described in 4-page booklet. More than 100 minerals are tabulated in table listing magnetic attractability of minerals. Bul 2091 — Stearns Magnetic Products, 635 South 28th St., Milwaukee 46, Wisconsin.

Check 2015 opposite last page.

Industrial protein's characteristics and uses are discussed in 20-page booklet. Characteristics of product formulations based on organic solvents, and advantages of water dispersions are discussed. "ZEIN — A Versatile Protein for Industry" may be obtained from Corn Products Sales Company, 17 Battery Pl., New York 4, N. Y.

Check 2016 opposite last page.

Organolithium compounds' uses in organic synthesis are summarized in 167-page booklet. Abstracts of 451 papers published during 1956 and 1957 are listed alphabetically by author and numbered consecutively. Index is included in "Annotated Bibliography On The Use Of Organolithium Compounds In Organic Synthesis, Supplement No. 5", available at $1.50 per copy from Technical Service Division, Lithium Corporation of America, Inc., 1100 Title Insurance Building, Minneapolis 1, Minn.

HIGHEST ACCURACY . . . LOW COST

MERCURY PRESSURE GAUGES

For any low-pressure air or gas application, Meriam Mercury Pressure Gauges provide *permanent* accuracy and economy.

Recalibration or checking is never required. No gears, diaphragms, springs, levers or pivots are involved. Mercury pressure gauges are always accurate.

Direct reading in ounces, pounds or inches of water...ranges are available to eight pounds or equivalent. Special features provide overrange protection.

WRITE FOR BULLETIN P-10

THE MERIAM INSTRUMENT CO.
10920 Madison Avenue
Cleveland 2, Ohio

Pressure and Vacuum Gauges, Liquid Level Gauges and Flowmeters

Check 2017 opposite last page

STAINLESS STEEL CONVEYOR SCREWS

4", 6", 9", 12" DIA.

for immediate delivery

STOCKED IN TWO STYLES

- Continuous Welded and Polished
- Industrial Finish

M-H STANDARD CO.
514 Communipaw Ave., Jersey City 4, N. J.

Other M-H Products	
	VERSABAR Metal Framing.
	ARMORBELT Metal Belt Conveyor.
	MONOFLO Rotating Cable Conveyor.

Check 2018 opposite last page

NEW LITERATURE

Silicone rubber that can be vulcanized at room temperature is discussed in bulletin. Included are product and application data for three RTV compounds said to have improved physical properties and heat resistance. Bul CDS 170 — Silicone Products Department, General Electric Company, Waterford, N. Y.

Check 2019 opposite last page.

Truck batteries which can be interchanged in more than one size of industrial truck are described in six-page technical bulletin. Form 6230 — Exide Industrial Division, The Electric Storage Battery Company, Rising Sun & Adams Aves., Philadelphia 20, Pa.

Check 2020 opposite last page.

Pulp refiner — that combines primary and secondary refining in one machine is described and illustrated in 4-page bulletin. Horsepower needs are said to be cut in half. J-U-D Refiner — The Noble & Wood Machine Company, Hoosick Falls, New York.

Check 2021 opposite last page.

Research highlights of the National Bureau of Standards for year 1958 are reviewed in 138-page publication. Report also describes Bureau's roll in international geophysical year. Publication 226 may be obtained by submitting 45 cents direct to Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C.

Roll-type air filter with renewable filter media is described in 12-page booklet. Dimensional drawings and specifications are included. Bul 248-C—Dept. PD, American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.

Check 2022 opposite last page.

New light on how nickel reduces corrosive attack by fast-moving chlorinated solvents

Most chemical processors know that dilute HCl formed by decomposition of chlorinated solvent-water mixtures corrodes steel much more readily than Nickel.

But it's not so widely known that in Nickel equipment there is less hydrolysis of solvent . . . less formation of HCl to cause damage.

National Aniline puts this Nickel extra to good use in making diisocyanate

From the time diisocyanate is formed in a Nickel-clad reactor at National Aniline's Moundsville, W. Va. plant, the product touches no metal other than Nickel. Tanks are Nickel. Miles of tubing. Pumps. Cast fittings.

Here in the photograph is just *one* example. It's a sight-flow indicator with cast Nickel body. Based on corrosion to date, this cast Nickel body is expected to last ten years or more despite location of the indicator in a return line carrying fast-moving chlorinated solvent, phosgene, and the troublesome dilute HCl.

Jacoby-Tarbox Corp. had Inco cast the body parts for this sight-flow indicator

In producing sight-flow indicators, pressure tightness and strength are all important. Gasketing, glass seal, and castings must meet high specifications and close tolerances.

Consequently, Jacoby-Tarbox has Inco cast the body of indicators that will be used in lines carrying corrosives. Inco is a primary source for Nickel and its alloys and the Inco foundry has long experience in casting these materials.

What can <u>you</u> expect from cast Nickel?

An Inco phamphlet, "Engineering Properties of Cast Nickel" answers this question in detail . . . covering compositions, physical constants, hot hardness, mechanical properties, much more. Send for your copy.

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street New York 5, N.Y.

INCO TRADE MARK

INCO-CAST PRODUCTS

Check 2023 opposite last page

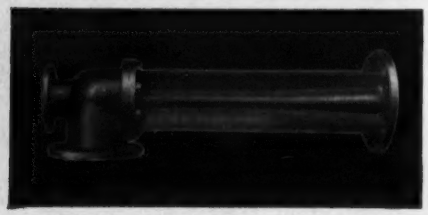
Simplify handling of

fluids, vapors, gases . . .

and "HOT" MATERIALS

Series 1A and 20A Ejectors perform efficiently over a wide range of operating conditions.

Series 60A fluid operated jet pump for lifting, elevating and blending liquids or slurries.



Special jet pump for handling corrosive chemicals. Stainless steel with flanged connections.

Low-cost, compact Penberthy ejectors provide many unique dependable services in AEC operations, chemical and petroleum processing, power, water and sewage handling and many other industries.

Through long specialized experience, Penberthy has successfully adapted the simple jet principle to a variety of applications. Penberthy ejectors are now incorporated into numerous OEM products; are being used increasingly where mechanical pumps simply cannot be used or are at an economic disadvantage.

They are available in standard, modified and specially designed models from a variety of materials. Worth investigating, Penberthy jet pumps are detailed in Catalog 512R — sent on request.

PENBERTHY
MANUFACTURING COMPANY
Division of the Buffalo-Eclipse Corporation
1242 Holden Avenue, Department CP
Detroit 2, Michigan

Series 60P corrosion-resisting Uscolite plastic hydraulic ejector. Rigid. Tough. Lightweight.

Special stainless steel where corrosion resistance and/or non-contamination are required.

PENBERTHY EJECTORS

STEAM, AIR & LIQUID OPERATED FOR:

Liquid Transfer, Heating, Circulating, Aerating, Agitating, Mixing, Pumping, Blending and Exhausting Air or Vapor against High Vacuum.

There's Certain Satisfaction in **PENBERTHY Cycling Jet Pumps • Ejectors Injectors • Electric Sump Pumps**

Check 2024 opposite last page

NEW LITERATURE

Mobile elevators—20-page booklet presents basic information on vertical elevators. "The Portable Elevator for Vertical Material Handling"—Association of Lift Truck and Portable Elevator Manufacturers, Suite 759, 1 Gateway Center, Pittsburgh 22, Pa.

Check 2025 opposite last page.

Teflon-lined pipe and fittings, which provide freedom from corrosion and contamination, are discussed in four-page bulletin. Second bulletin covers Teflon Bellows. Bul TS-1 and B-1 — Resistoflex Corporation, Roseland, New Jersey.

Check 2026 opposite last page.

Polyester molding compound that is glass-reinforced is described in four-page technical information folder. Tables provide data on physical, electrical, and chemical properties. Recommended molding conditions for compression and transfer techniques are given. Folder on Thermaflow® 105 may be obtained from Chemicals Division, Atlas Powder Company, Wilmington 99, Del.

Check 2027 opposite last page.

Slide rule calculator which calculates sound levels by the "sone" rating system is available at no charge by writing on your company letterhead to Propellair Div., Robbins & Myers, Inc., Springfield, Ohio.

Conveyor chain with connecting side plates stamped with embossed surface to protect rivet heads are described in bulletin. Conveyor Chain Bul — Agricultural Chain Division, Chain Belt Company, Dolton, Ill.

Check 2028 opposite last page.

General-service valves are detailed in 20-page bulletin. Types, typical services, construction and operating features are given. Bul E-165—Everlasting Valve Co., 49 Fisk St., Jersey City 5, New Jersey.

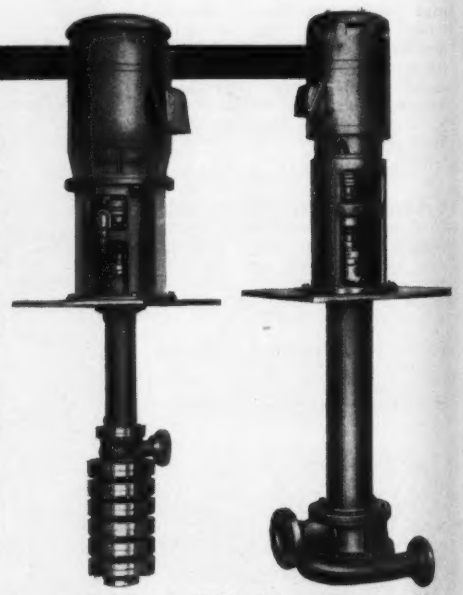
Check 2029 opposite last page.

Magnetic traps are covered in literature which includes complete installation and application information. Magnetic Trap Literature — Eriez Mfg. Co., 73-SA Magnet Dr., Erie, Pa.

Check 2030 opposite last page.

PUMPS

for liquid oxygen, nitrogen & other liquefied gases



FEATURES:

1. Vertical top suction to prevent gas binding when NPSH drops below safe level.
2. Packing box never comes in contact with liquid, only with gas blanket in pipe column.
3. Packing box fitted with special mechanical seal.
4. Meticulous care in design and material selection eliminates troubles due to expansion differences and prevents galling.

Lawrence High Pressure Multi-Stage Pump for Liquid Oxygen

Lawrence Medium and Low Pressure Pump for Liquid Oxygen

LAWRENCE PUMPS, INC.
371 Market Street, Lawrence, Mass.

Write for bulletin 203-7

Check 2031 opposite last page

HERE'S THE MOST COMPLETE NOZZLE CATALOG EVER PUBLISHED

Whatever your nozzle problem, look first in this new catalog by Spraco. Here is complete information on a wide range of nozzle types and sizes as well as general spraying coverage data.

Send for your **FREE** *copy today . . .*

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Engineering Company
105 Cambridge Street, Burlington, Mass.

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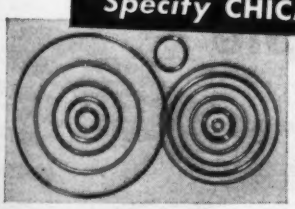
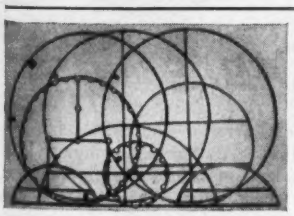
For Dependable GASKETS

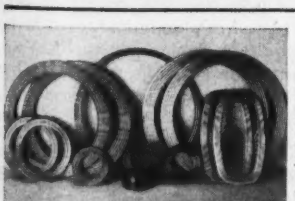
Specify CHICAGO-WILCOX



RING GASKETS
For ring-type flanged joints in high pressure lines. Made of soft iron, standard steel alloys or any non-ferrous metal to any desired cross section. Ask for Bulletin 563.



HEAT EXCHANGER GASKETS
Made in any size or shape needed in double-jacket type. Also cut from solid metal or sheet packing. Ask for Bulletin 564.



CORRUGATED METAL GASKETS
Plain or jacketed type. Made of ingot iron, aluminum, stainless steel, copper, brass, nickel and monel in all sizes and shapes. Ask for Bulletin 565.

CHICAGO-WILCOX MFG. CO.

Prompt Deliveries
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Chicago 19, Illinois

Check 2033 opposite last page

NEW LITERATURE

Aluminum bottles with capacities from ⅛ to 768 ounces are described in four-page brochure. Materials that can be packaged, shipped, or stored in aluminum without hurting property value of either are listed. Bul AA45—American Aluminum Company, Mountainside, N. J.

Check 2034 opposite last page.

Pressure elements which include bellows, bourdon-tube, and liquid-filled types are covered in eight-page technical bulletin. Specifications are given on elements in various pressure ranges. Ranges for various types in different applications are listed. Tech Bul 11P-1000—Fischer & Porter Co., 845 Jacksonville Rd., Hatboro, Pa.

Check 2035 opposite last page.

Liquids-handling equipment, including heavy-duty delivery cans, measuring buckets, and funnels are described in four-page bulletin. Products Memo 114—George D. Ellis & Sons, Inc., American & Luzerne Sts., Philadelphia 40, Pa.

Check 2036 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Cranes featuring hydraulic brakes, three-reduction hoist, and provision for control from cab or from shop floor are detailed in six-page folder. "Keep Your Capital Investment Down"—Whiting Corporation, 157th & Lathrop Ave., Harvey, Ill.

Check 2037 opposite last page.

Organic chemicals, more than 400 in number, are covered in 28-page booklet. Tabulations show physical properties. Brief descriptions of fields of application are given. A center spread features new chemicals available now only in development quantities but which may be commercially available next year. "Physical Properties"—Union Carbide Chemicals Company, Div. of Union Carbide Corporation, 30 East 42nd St., New York 17, N. Y.

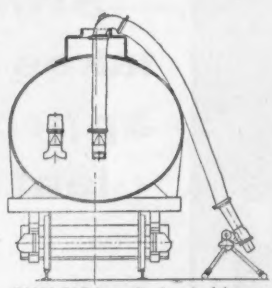
Check 2038 opposite last page.

Mass spectrometers of process-monitor type are detailed in 16-page booklet. Applications and performance characteristics are covered. Bul 1824C—Consolidated Electrodynamics Corporation, 300 North Sierra Madre Villa, Pasadena, Calif.

Check 2039 opposite last page.

When the design calls for an indicating gauge, specify the best—
MARSH
New catalog covers gauges for every need
MARSH INSTRUMENT CO.
Sales Affiliate of Jas. P. Marsh Corporation
Dept. Z, Skokie, Ill.
Marsh Instrument & Valve Co. (Canada) Ltd.
8407 103rd Street, Edmonton, Alberta
Export Dept.
3501 Howard Street, Skokie, Ill.

Check 2040 opposite last page



TANK CAR is easily freed of fumes for workers' safety.

CHEMICAL STILL is here ventilated while being repaired.

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Design "A" Ventilator

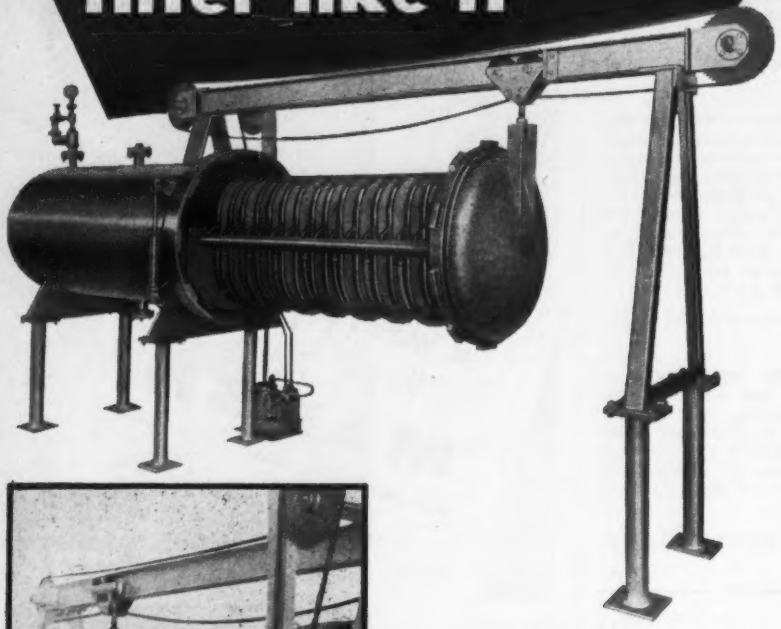
Improve workers' safety—health—comfort—efficiency. Get rid of dangerous gases, fumes, stagnant air. Coppus Design "A" Ventilator ventilates tanks, tank cars, drums, vats, underground cable manholes, pipe galleries, airplane wing compartments, fuselages. For complete information, write Coppus Engineering Corporation, 385 Park Ave., Worcester 2, Mass. Sales Offices in *Thomas' Register.*

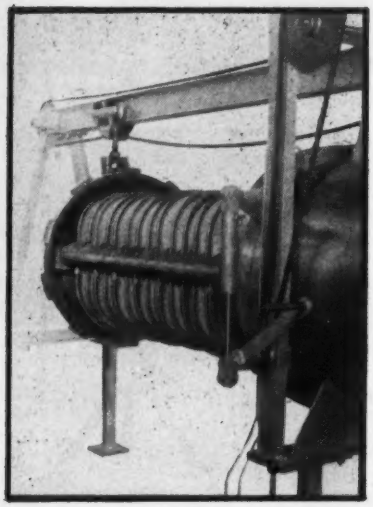
Other "Blue Ribbon" Products in *Chemical Engineering Catalog, Refinery Catalog, Best's Safety Directory* and *Mining Catalogs.*

ANOTHER
COPPUS
"BLUE RIBBON" PRODUCT

Check 2041 opposite last page

No other pressure filter like it





SHRIVER takes a fresh approach to leaf filters

Here are new design features based on a well rounded 50-year knowledge of pressure filtration applications.

These illustrations, for example, show some novel and important improvements in leaf retraction mechanism and cake discharge, calculated to facilitate operation and cleaning.

Let us show you how the new Shriver filter improvements can help solve your filtration problems. Write for Bulletin 146.

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SALES REPRESENTATIVES IN: Chicago, Ill.—Atlanta, Ga.—Houston, Tex.—Detroit, Mich.
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HORIZONTAL PLATE FILTERS • CONTINUOUS THICKENERS
SLAB FORMERS • DIAPHRAGM PUMPS • ELECTROLYTIC CELLS

Check 2042 opposite last page

NEW LITERATURE

Continuous chemical analysis accomplished by an automated system is described in eight-page brochure. Automation of analytical procedures and product quality control in plant are shown. Industrial applications are listed as well as specific analysis for wide variety of trace materials. Bul 584—Technicon Controls, Inc., Chauncey, N. Y.

Check 2043 opposite last page.

Space age manufacturing is subject of illustrated manual. Eighteen photographs of missile and guidance systems components, electronic cabinetry, and special handling equipment are shown. Other pictures illustrate firm's production facilities. Space age brochure—Farwell Metal Fabricating, 81 West Fairfield Ave., St. Paul 7, Minnesota.

Check 2044 opposite last page.

Mechanical seals and how they're used is presented in four-page catalog section. Typical installations are used to illustrate. "Mechanical Seals"—Syntron Co., Homer City, Pa.

Check 2045 opposite last page.

Hoists and cranes are subject of eight-page folder which contains data on construction, weight, dimensions, suspensions, clearances, other information. Bul DH-28—Wright Hoist Division, American Chain & Cable Company, Inc., York, Pa.

Check 2046 opposite last page.

Proportioning pump for use with general industrial fluids is described in two-page bulletin. Capacity table is a feature. Dimensional line drawings are included. Bul 1106.20A-1—B-I-F Industries Inc., 345 Harris Ave., Providence 1, Rhode Island.

Check 2047 opposite last page.

Air pollution is subject of a 42-page bulletin which summarizes National Conference on Air Pollution held in Washington last November. "Highlights" — Air Pollution Control Program, Bureau of State Services, Public Health Service, Washington 25, D.C.

Bulk-handling system is analyzed in 20-page Cat 7—Tote System Inc., Beatrice, Neb.

Check 2048 opposite last page.

Reduce Installation Cost of Thermocouple Extensions with THERMO-CABLE

You can now install 6 to 56 pairs of thermocouple leads at one time with "Thermo-Cable," T-E's new multi-conductor extension cable. Installed in conduit, "Thermo-Cable" reduces costs by eliminating the need to pull individual conductors—and permits the use of smaller conduit for the same number of leads. "Thermo-Cable" can also be installed without conduit, in open troughs or in raceways.

"Thermo-Cable's" smooth, polyvinyl chloride outer jacket resists moisture, heat, abrasion and chemical action—slips easily through conduit. ISA coded, individual conductors are also insulated in hi-temp (221°F.) polyvinyl chloride—and the conductor bundle wrapped in aluminum-backed Mylar for electrostatic shielding. Pairs are numbered alike and lie next to each other. "Thermo-Cable" is available in 6, 14, 25, 39 or 56 pairs and comes in all standard thermocouple materials.

Write For Wire Section 33-R

Thermo Electric CO., INC.
SADDLE BROOK, NEW JERSEY

In Canada:
THERMO ELECTRIC (Canada)
Brampton, Ont.

Check 2049 opposite last page

Research chemicals — More than 250 compounds that may be used in product development work are listed in 56-page catalog. Approximately 120 new compounds not listed in first edition, last year, are included. Information includes chemical's name, formula, description, properties, and size of sample available. "Research Chemicals from Dow" — Technical Service and Development, The Dow Chemical Company, Midland, Mich.

Check 2050 opposite last page.

Hose couplings and fittings are profusely illustrated in eight-page bulletin. Several new items have been added. Cat 34—Hose Accessories Co., 2704 N. 17th St., Philadelphia 32, Pa.

Check 2051 opposite last page.

Power scoop (for box car unloading with one operator) is specified in four-page folder. Applications, together with data on electronic radio transmitter for immediate stop/go, are described. Bul 6-0—Alden Equipment Division, Amercon Corporation, 900 N. Alvarado St., Los Angeles 26, Calif.

Check 2052 opposite last page.

Metallizing systems, procedures for protecting steel surfaces with metallic coatings, are described in four-page bulletin. Bul 93XG—Metallizing Engineering Co., Inc., 1101 Prospect Ave., Westbury, Long Island, N. Y.

Check 2053 opposite last page.

Radioactivity counting and analyzing instruments and systems are described and illustrated in 5-page catalog. Thirty-two devices are featured. Cat A-3—Baird-Atomic, Inc., 33 University Road, Cambridge 38, Mass.

Check 2054 opposite last page.

Vibrating conveyors & feeders are subject of 96-page catalog covering controls, installation methods, operation, and specifications. Cat 930—The Jeffrey Manufacturing Company, Columbus 16, Ohio.

Check 2055 opposite last page.

Steam generators and allied equipment are referenced in 20-page catalog providing cross-section views. Cat SB 60—Erie City Iron Works, Erie, Pa.

Check 2056 opposite last page.

Scientific Scenting for SALES

RESODORS® . . . . . PARADORS®

Consumers are invariably guided by *first impressions* . . . and in plastic and rubber household goods, a repulsive odor can arouse displeasure —*even before* a product is used.

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Industrial Aromatics and Chemicals

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Check 2057 opposite last page

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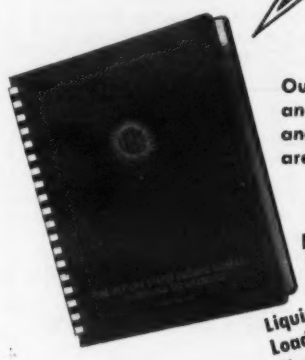
2648

Could be — Your Present Centrifugals Can Be Modernized

Time tested "Roberts" accessories are available for application to your existing suspended type machines. Increase production, improve quality, reduce operator hazards.



Our Booklet No. 2648 illustrates and describes many of these units and applications. Among them are the following —

Automatic Dischargers
Handair Dischargers
Turntork Reverse Discharge Drive
Liquid Vapor Seal
Load Measuring Device
Wash Manifold and Control
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1702 Fairgrove Avenue
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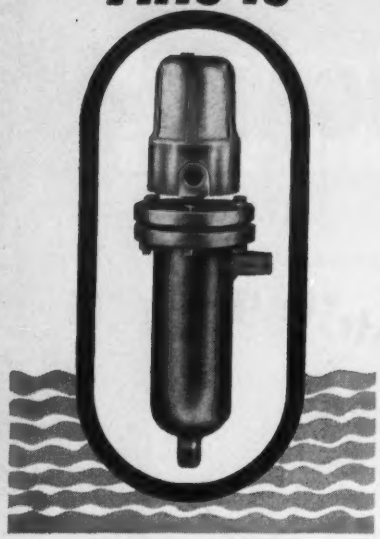

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- *Models for all types of liquids.*
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Jo-Bell Products, Inc. Dept. B
5456 W. 111th St., Oak Lawn, Ill.
Send full information on Level Master and name of nearest representative.

My name_____
Company_____
Address_____
City_____ Zone____ State____

Check 2059 opposite last page

NEW LITERATURE

Pressure regulators for cylinder, manifold, and station are covered in 36-page catalog. Flow and pressure specifications, dimensions, and connections are described in detail. Form AD 705F—Air Reduction Sales Co., Div. of Air Reduction Co., Inc., 150 E. 42nd St., New York 17, N.Y.

Check 2060 opposite last page.

Steel containers—Simple method of computing steel shipping container weights is explained in eight-page booklet. "What Should Steel Shipping Containers Weigh?" is available from Steel Shipping Container Institute, Inc., 600 Fifth Ave., New York 20, N.Y.

Truck attachments, designed for greater truck flexibility and versatility, are described in four-page folder. Truck attachment folder—The Elwell-Parker Electric Company, 4205 St. Clair Ave., Cleveland 3, Ohio.

Check 2061 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Magnetic separators of high intensity, induced roll type, receive full treatment in four-page bulletin with supplementing specification sheets. "Table of Magnetic Attractibility of Minerals" is highlighted. Bul 2091—Stearns Magnetic Products, 635 S. 28th St., Milwaukee 46, Wis.

Check 2062 opposite last page.

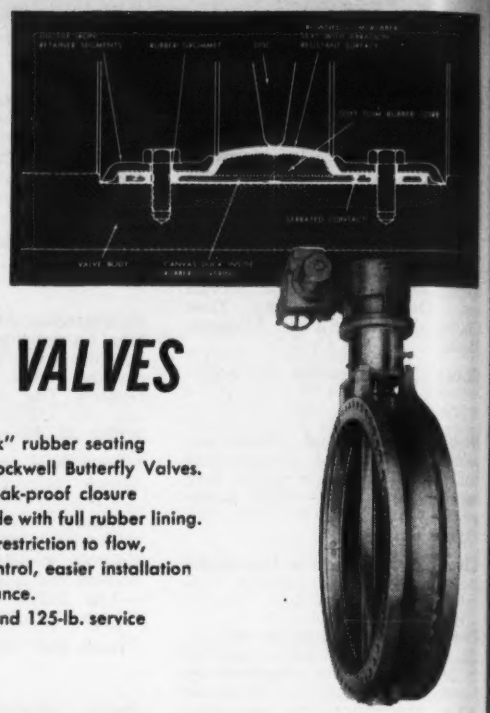
Emulsions and detergents are described in 100 pages of detailed technical information in 10th edition of formulary. Specific formulas containing company's products for use in various fields are spelled out. Sections on polishes, cosmetics, and detergents are specially emphasized. These sections include new compositions containing new chemicals. Booklet F-4186E—Union Carbide Chemicals Company, Div. of Union Carbide Corporation, 30 East 42nd St., New York 17, New York.

Check 2063 opposite last page.

Straddle carriers have their specifications and construction features detailed in four-page brochure. Charts and graphs of operating characteristics are included. Straddle Carrier Bul—Industrial Truck Division, Clark Equipment Company, Battle Creek, Mich.

Check 2064 opposite last page.

DRIP-TIGHT SHUT-OFF *with* ROCKWELL *BUTTERFLY VALVES*



The matchless new "Wedge-Lock" rubber seating provides drip-tight shut-off in Rockwell Butterfly Valves. Its unique construction makes leak-proof closure sure and safe. Valves can be made with full rubber lining.

Other advantages—minimum restriction to flow, positive manual or automatic control, easier installation in less space, minimum maintenance.

Made in all sizes, in 25-, 50- and 125-lb. service in all industrial applications.

Write for Bulletin 582.

ROCKWELL SINCE 1888 BUILT

W. S. ROCKWELL COMPANY

Valves - Butterfly • Slide • Diaphragm • Special

2209 Eliot Street • Fairfield, Conn.

Check 2065 opposite last page

Prevent Weather and Salt Spray Corrosion!

MARKAL "D-A" COATINGS — provide metals a permanent "shield" against corrosive weather conditions, salt sprays, sulfur fumes from burning coal, water steam, hot acids, mild alkalies or other corrosive conditions at ambient temperatures up to 600°.

You can use "D-A" in a wide range of industrial applications from food and dairy plants to foundries, sewage plants and ore sintering plants, where it adheres to all metals even galvanized without acid treatment.

Markal "D-A" is easy to use, can be brushed or sprayed.

Write on company letterhead for complete information, literature and recommendations.

MARKAL . . . The Mark of Quality

MARKAL COMPANY

3055 West Carroll Avenue, Chicago 12, Illinois

Check 2066 opposite last page

NEW LITERATURE

Belt-conveyor idlers are subject of 40-page key-indexed booklet. Wide variety of specifications is included. Book 2716—Dept. PR., Link-Belt Company. Prudential Plaza, Chicago 1, Ill.

Check 2067 opposite last page.

Plant maintenance and restoration are subject of four-page brochure containing thumbnail descriptions of 21 leading "building savers". Cat BP6030—L. Sonneborn Sons, Inc., Building Products Div., 404 4th Ave., New York 16, N.Y.

Check 2068 opposite last page.

Nuclear power plant operated by organic reactor is described in illustrated, four-color, 28-page brochure. History, economics, safety features, and operating details are included. "The Organic Reactor Nuclear Power Plant" — Atomics International, A Division of North American Aviation, Inc., Canoga Park, California.

Check 2069 opposite last page.

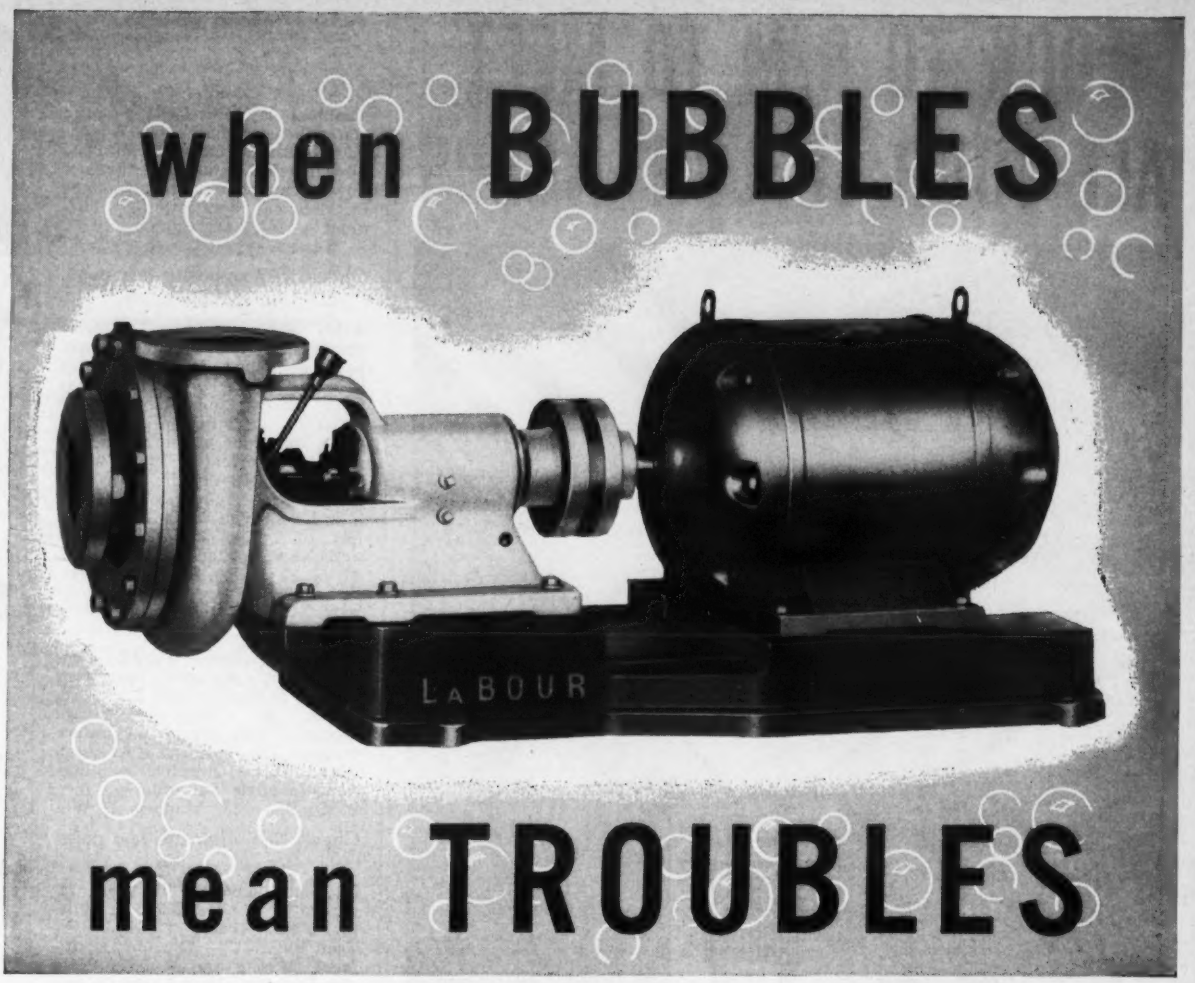
Electronic weighing system—Two-page bulletin gives information on installation, operation, applications, size, capacity, and specifications. Bul G-569—Dept. 959, Cherry-Burrell Corporation, Cedar Rapids, Iowa.

Check 2070 opposite last page.

Insulations which are effective up to 1800°F are described and illustrated in eight-page, two-color brochure. No. 1-IN-759—Owens-Corning Fiberglas Corp., Toledo 1, Ohio.

Check 2071 opposite last page.

"Oh, Hennessy, take care of this gent from the Air Pollution Committee—he wants to sniff around!"



Aerated solutions and volatile liquids are difficult or impossible to handle with ordinary centrifugal pumps, yet in many operations use of positive displacement pumps just brings on troubles of a different kind. The answer is LaBour Type Q, a non-priming centrifugal with extraordinary ability to handle large amounts of air or vapor mixed with the liquid it pumps.

Occasional "gulps" of air or vapor will not bind a LaBour Type Q. In general, Type Q can rid itself of gases not exceeding 20% of the total volume being pumped. Thus it is suited for many applications which would otherwise require a more costly self-priming unit.

LaBour dependability is of course a feature of this pump, which has only one moving part and no close clearances. If you're having an air or vapor problem, particularly in connection with corrosive liquids, you'd better drop us a line.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

LABOUR

THE LaBOUR COMPANY, INC. • ELKHART, INDIANA, U.S.A.

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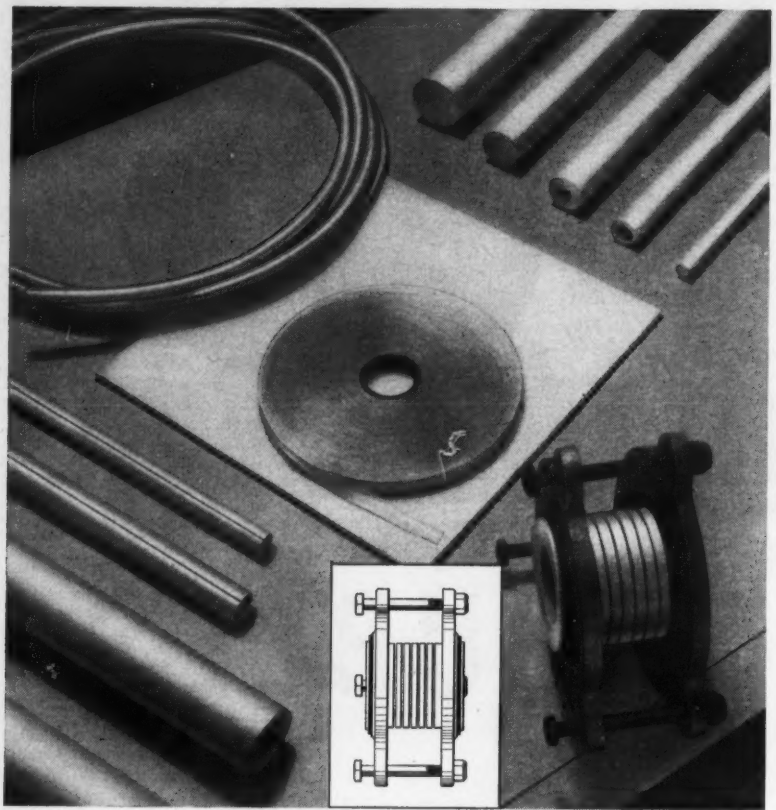
LOOK TO R/M TO MEET ALL YOUR TEFLON* NEEDS



R/M—headquarters for "Teflon" products. R/M's complete line includes sheets, rods, tubes, tape, thin-wall tubing (available with permanent color striping) and bondable "Teflon." New "Teflon" expansion joint features square convolutions for greater strength. Other "Teflon" parts, extruded, molded or machined to your exact specifications, can also be supplied.

"Teflon's" many remarkable properties have established it as an important material for use in chemical processing equipment. Yet when you select "Teflon" for a particular job, you solve only part of your problem. Equally important is the selection of a source of supply you can depend on for both competent engineering assistance and the production capability needed to meet your exact specifications and quantity requirements. This *complete* "Teflon" service is yours from R/M.

A pioneer in "Teflon" application and fabrication research, R/M offers design guidance that can help assure maximum part performance, and its ample production facilities can supply "Teflon" in the form best suited to your needs. Learn more about R/M's complete "Teflon" service—and how it can benefit you—by contacting your nearest R/M district office. Or write Plastic Products Division, Manheim, Pa.

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Sintered Metal Products • Rubber Covered Equipment • Abrasive and Diamond Wheels • Brake Linings
Brake Blocks • Clutch Facings • Laundry Pads and Covers • Industrial Adhesives • Bowling Balls

Check 2073 opposite last page

NEW LITERATURE

Titanium is subject of 36-page comprehensive brochure. It contains the latest technical information on the metal and discusses how it can be used to advantage in chemical applications. "Titanium"—Harvey Aluminum, 19200 S. Western Ave., Torrance, Calif.

Check 2074 opposite last page.

Acids and anhydrides, formerly discussed in two brochures, have been combined in one 44-page booklet. Special emphasis has been placed on solubilities of materials in other organic solvents, on vapor pressures, and on azeotrope formation with water and various organic solvents. "Acids and Anhydrides"—Union Carbide Chemicals Company, Div. of Union Carbide Corporation, 30 East 42nd St., New York 17, N. Y.

Check 2075 opposite last page.

Space objectives—Work conducted by research laboratory actively engaged in this field is reviewed in illustrated 15-page brochure. Both present and future projects are discussed. "Research with Space Objectives"—Bjorksten Research Laboratories, Inc., P. O. Box 265, Madison 1, Wis.

Check 2076 opposite last page.

Diatomite mineral fillers are reviewed in 12-page technical bulletin which covers various uses. Tech Bul E41 — Dicalite Department, Mining and Mineral Products Division, Great Lakes Carbon Corporation, 612 S. Flower St., Los Angeles 17, Calif.

Check 2077 opposite last page.

Couplings are covered in 20-page bulletin listing straight-through, single-check-valve, and double-check-valve types. Flow and pressure data are included in Bul QSR 58—Titeflex, Inc., Hendee St., Springfield 4, Mass.

Check 2078 opposite last page.

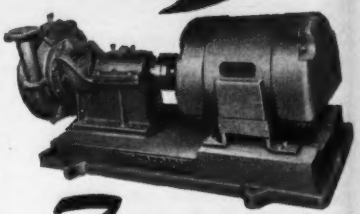
Packaged demineralizers are reviewed in 4-page brochure. Units can handle flow rates from a few gals to 10,000 gph and up. Over 100 users are listed. "Industrial Demineralizers"—Penfield Manufacturing Co., Inc., 19 High School Ave., Meriden, Conn.

Check 2079 opposite last page.

Process chromatograph for continuous monitoring or control of process streams is covered in eight-page bulletin. Applications and operating features are given. Bul 1836C—Analytical and Control Instrument Division, Consolidated Electrodynamics Corporation, 300 North Sierra Madre Villa, Pasadena, Calif.

Check 2080 opposite last page.

Custom-built for EFFICIENT DEPENDABLE SERVICE



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SSV PUMPS

Enclosed Impeller and Open Impeller Types

You're sure of maximum service and output with minimum maintenance or production down time with Frederick SSV Centrifugal Pumps because each pump is custom-made to fit your particular operation—whatever the consistency or type of liquid you're moving.

SSV PUMP FEATURES

- **Pump sizes from 1" to 4" discharge openings.**
- **Pump capacities from 50 up to 700 U.S. GPM.**
- **Heads from 30 up to 220 feet.**
- **Pumps speeds can be varied to suit the driving media and operating conditions.**

CONSTRUCTION ADVANTAGES

Pump casings are vertically split for easy accessibility. Mounted on a swivel to permit placing discharge in any desirable position. Pump openings, both suction and discharge, flanged to permit easier connection and disconnecting to joints. One-piece impellers, securely attached to shaft by stout key and lock nut, or threaded, give long service. Pump bearings mounted in sturdy frame horizontally split for easier accessibility. Extra long stuffing box provides for oversize stuffing. Mechanical seal also available for minimum leakage. Pump coupling flexible for direct connection to drivers or can be arranged for belt drive. Pump speed, pump openings, etc. are selected to suit your particular requirements.

Write for Bulletin No. 107

FREDERICK PUMPS

FREDERICK IRON AND STEEL, INC.
FREDERICK Est. 1890 MARYL...

Check 2081 opposite last page

ADVERTISERS in this issue

A

Abbé Engineering Co. 129
Abbé Inc., Paul O. 164
Acoustica Associates, Inc. 77
Air-Maze Corporation 12
Airslide Car Department, General American Transportation Corporation 59
Ajax Flexible Coupling Co. Inc. 202
Allen-Bradley Co. 191
Allied Chemical Corp., General Chemical Division ..... 2nd Cover, 83
Allied Chemical Corp., National Aniline Division 119
Allied Metal Hose Company 155
Allis-Chalmers 49, 63
Allis-Chalmers, Industrial Equipment Division 65
Alloy Products Corp. 163
Alloy Steel Products Company Subsidiary of Walworth 128
Allpax Company, Inc., The 68
Aluminum Company of America 100-101
Amercoat Corporation ..... 4th Cover
American Brass Company, The 108
American Chain & Cable Company, Inc., Helicoid Gage Division 16
American Hard Rubber Company, Division of Amerace Corporation 169
American Machine and Metals, Inc. 114-115
American Machine and Metals, Inc., DeBothezat Fans Division 128
American Meter Company Inc., Pump Division 102
American-Standard Industrial Division .. 185
American Steel & Wire Division, United States Steel Corporation 24
American Sterilizer, Scientific Division 179
Ampco Metal, Inc. 158
Armstrong Machine Works 69

B

Babbitt Steam Specialty Co. 182
Babcock & Wilcox Company, The, Tubular Products Division 195
Bacharach Industrial Instrument Company 80
Barco Manufacturing Co. 76
Bartlett & Snow Co., The C. O., Material Handling and Processing Division ..... 3rd Cover
Becco Chemical Division, Food Machinery and Chemical Corporation 79
Bellows Co., The, Division International Basic Economy Corporation 120
Belmont Packing and Rubber Company, The 112
Binks Manufacturing Company 169
Blackmer Pump Company 218
Brighton Corporation 174
Bristol Company, The 126-127
Buffalo Pumps, Division of Buffalo Forge Co. 67
Burgess-Manning Company, Industrial Silencer Division 130

C

Cambridge Wire Cloth Co., The 197
Carboline Company 154
Carver Inc., Fred S. 198
Catalin Corporation of America 8
Celanese Corporation of America, Chemical Division 87
Centrifix Corporation 203
Chemical and Industrial Corp., The 95
Chemical & Power Products, Inc. 154
Chempump Corporation 74
Chemtrol 159
Chicago-Wilcox Mfg. Co. 209
Cleveland Hard Facing Inc. 156
Cleveland Vibrator Company, The 190
Colonial Plastics Mfg. Co., Subsidiary of The Van Dorn Iron Works Co. 182
Columbia-Geneva Steel Division, United States Steel Corporation 24
Commercial Filters Corporation 166
Connecticut Hard Rubber Co., The 199
Continental Can Company 56
Cook Company, C. Lee, Division of Dover Corporation 110
Coppus Engineering Corporation 209
Crane Co. 71, 72
Crane Packing Company 4
Croll-Reynolds Co., Inc. 120
Curtiss-Wright Corporation, Electronics Division 104

D

Darling Valve & Manufacturing Co. 199
Davison Chemical Division, W. R. Grace & Co. 125
Dawe's Laboratories, Inc. 97
Day Company, The 215
DeBothezat Fans Division, American Machine and Metals, Inc. 128
Deming Company, The 201
Devcon Corporation 68
Dorr-Oliver Incorporated 152
Dow Corning Corporation 82
Dry-Flo Car Department, General American Transportation Corporation 41
Du Pont de Nemours & Co. (Inc.), E. I., Elastomer Chemicals 105
Durametallic Corporation 122
Dustex Corp. 202
Dwyer Mfg. Co., F. W. 14

E

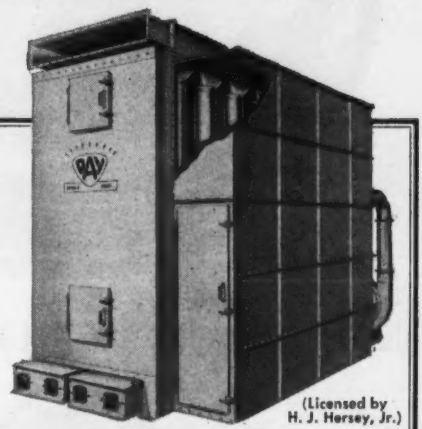
Eastern Industries, Inc. 129
Eastman Chemical Products, Inc., Subsidiary of Eastman Kodak Company .. 9
Eaton-Dikeman Co., The 118
Eco Engineering Company 17
Eimco Corporation, The 116
Elgin Softener Corporation 137
Emery Company, The A. H. 111
Eriez Mfg. Co. 44
Essex Conveyors, Inc. 52

F

Fairbanks, Morse & Co. 11
Falcon Alarm Co., Inc. 205
Filtration Engineers 114-115
Filtration Fabrics 114-115
Fletcher Works, Incorporated, The, Centrifugal Division 192
Flexrock Company 218
Fluid Energy Processing & Equipment Company 165
Foote Bros. Gear and Machine Corporation 131
Foremost Food and Chemical Company, El Dorado Division 88
Foxboro Company, The 117

DAY

DUST CONTROL NEWS



Largest selling filter of its type in the world!

DAY "AC" Reverse Jet Dust Filter

Cutaway view of DAY "AC"—available housed or unhoused—for pressure or suction.

(Licensed by H. J. Hersey, Jr.)

Better Dust Control Systems Cost Less When They Include a DAY "AC" Reverse Jet Filter!

Less equipment needed

Filtering rates for a DAY "AC" are 10 to 20 cubic feet of air per square foot of filter media. These are about five times greater than old style filters. This means you get maximum filtration from a minimum filter investment. Because virtually 100% of the DAY "AC" is operating at all times, no money is wasted on intermittent or standby units. One DAY "AC" will filter and keep separated, dusts from up to 10 different sources!

Less maintenance

You know all equipment requires *normal* inspection and care. But you'll find many DAY filters have been on the job for 5, 6, 7 or even 8 years that have had no repairs whatsoever. In short, *the Day "AC" is built* to last! They have an "appetite" for work and a reputation for dependability and long life.

Less space needed

Because of smaller diameter felt filter tubes the DAY "AC" gives you a greater air handling capacity in less space. DAY "AC" filters occupy up to 50% less space—an important consideration for plants of any size!

99.99+% filtering efficiency

The real "pay off" on DAY "AC" filters is their ability to clean dust laden air with near perfect efficiency! Even "tough" materials such as carbon black or atomic energy materials are filtered with optimum effectiveness.

For additional information about the DAY "AC" reverse jet dust filter write toDAY for Bulletin F-75. It also contains pages of useful air engineering data.

The* DAY *Company

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The DAY SALES Company
852 Third Avenue N.E.
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The DAY Company of Canada Limited
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EQUIPMENT ONLY OR A COMPLETE SYSTEM

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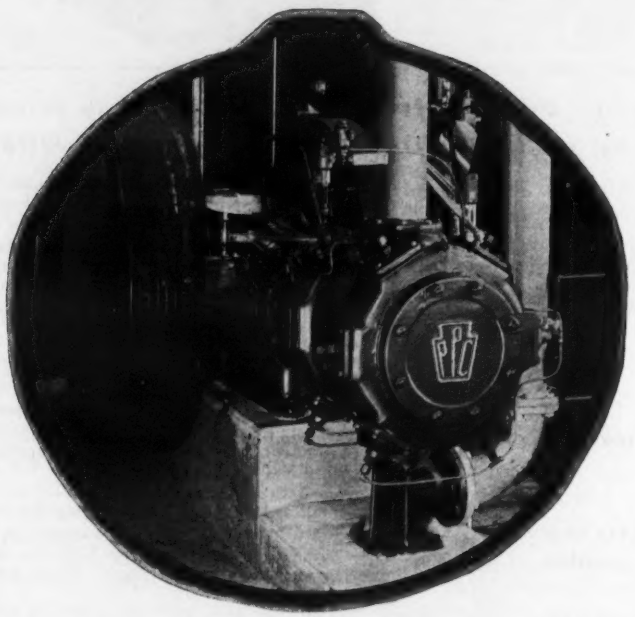
*with this valve

COMPRESSOR RUNS DAY AND NIGHT FOR 20 YEARS



Unusual? Yes, when you are not *getting* performance like this. No, when you have a Pennsylvania Compressor on the job. Long, long service without downtime is standard operating procedure with every Pennsylvania Compressor.

*Reason: the Pennsylvania Air Cushion Valve, constructed without nuts, bolts or screws. Stainless steel valve discs lift against a soft cushion of air; there is no flexing or bending action to weaken them. They will remain perfectly seated over long periods of service.

The compressor above delivered over 20 years of continuous performance . . . three days were lost once when it was moved, but that's all. Isn't it time you were on the receiving end of this kind of sure, sustained performance? Write today for your free copy of "Compressors for Industry" which describes Pennsylvania Compressors from 10 to 350 hp.

PENNSYLVANIA PUMP AND COMPRESSOR CO.

Easton, Pa. Earning Customer Confidence Since 1920

Check 2083 opposite last page

Frederick Iron and Steel, Inc. 214
Frick Co. 217
Fuller Company, Subsidiary of General American Transportation Corporation 64

G

Galigher Co., The 155
Garden City Fan Company 66
Garlock Packing Company, The 180-181, 190
Gates Rubber Company, The 98
Gaylord Container Corporation, Division of Crown Zellerbach Corporation 37
General American Transportation Corporation, Airslide Car Department 59
General American Transportation Corporation, Dry-Flo Car Department 41
General American Transportation Corporation, Process Equipment Division, Louisville Dryers 86
General Chemical Division, Allied Chemical Corp. ..... 2nd Cover, 83
General Electric Co., Willoughby Quartz Plant 73
Glas-Col Apparatus Company 142
Goodall Rubber Company 178
Goodrich Chemical Company, B. F. 96
Goslin-Birmingham Manufacturing Co., Inc. 103
Goulds Pumps, Inc. 175
Grace & Co., W. R., Davison Chemical Division 125
Great Lakes Carbon Corporation, Dicalite Department 84
Grinnell Company, Inc. 7

H

Hall Co., The C. P. 82
Hamer Valves Inc. 200
Hapman Conveyors, Inc. 62
Harrington & King Perforating Co., Inc., The 174
Harrisburg Steel Co., Division of Harsco Corporation 42
Harshaw Chemical Company, The 89
Hartzell Propeller Fan Co., Div. of Castle Hills Corp. 14
Hetherington & Berner Inc. 200
Heil Process Equipment Corporation 16
Helicoid Gage Division, American Chain & Cable Company, Inc. 16
Hercules Powder Company 85
Heyl & Patterson, Inc. 22
Highside Chemicals Incorporated 199
Hills-McCanna Company 193
Homestead Valve Manufacturing Company 157
Hooker Chemical Corporation 93
Hough Co., The Frank G., Subsidiary of International Harvester Company .. 55
Houghton & Co., E. F. 188
Howes Co., Inc., S. 172

I

I-T-E Circuit Breaker Company 18-19
Illinois Testing Laboratories, Inc. 174
Industrial Filter & Pump Mfg. Co. 160
Infilco Inc. 172
International Nickel Company, Inc., The 207
Irving Subway Grating Co., Inc. 178

J

Jamesbury Corp. 137
Jenkins Bros. 153
Jerguson Gage & Valve Company 188
Jo-Bell Products, Inc. 212
Johns-Manville 94
Jomac Inc. 176
Jones & Laughlin Steel Corporation, Stainless and Strip Division 109
Joy Manufacturing Company 61

K

Kano Laboratories 97
Kemp Mfg. Co., The C. M. 23
Kieley & Mueller, Incorporated 144
King Engineering Corp. 170
Koppers Company, Inc., Aeromaster Fan Dept. 186
Kuhns Brothers Co., The 150
Kunkle Valve Company 32

L

LaBour Company, Inc., The 213
Lawrence Pumps, Inc. 208
Lee Metal Products Company, Inc. 171
Lift Trucks, Incorporated 60
Link-Belt Company 36, 47
Lithcote Corporation 163
Lobee Pump & Machinery Co. 156
Louisville Dryers, General American Transportation Corporation, Process Equipment Div. 86
Lumenite Electronic Co. 218

M

M-H Standard Co. 206
Magline Inc. 62
Majac, Inc. 170
Manning, Maxwell & Moore, Inc. Consolidated Ashcroft Hancock Division 106, 134
Manton-Gaulin Manufacturing Co., Inc. 146
Markal Company 212
Marman Division, Aeroquip Corporation Industrial Sales Department 198
Marsh Instrument Co. Sales Affiliate of Jas. P. Marsh Corporation 209
Marton Equipment, Inc. 170
Marvel Industries, Inc. 52
Mason-Neilan, Division of Worthington Corporation 140-141
Mechanical Products Corporation 206
Meriam Instrument Co., The 206
Midwest Piping Company, Inc. 161
Milton Roy Company 124
Minnesota Mining & Mfg. Co. 28
Mojonnier Bros. Co. 70
Molded Fiber Glass Tray Co. 54
Monsanto Chemical Company, Organic Chemicals Division 92
Morehouse-Cowles, Inc. 50
Multi-Metal Wire Cloth Co., Inc. 205

N

National Airoil Burner Company, Inc. .. 196
National Aniline Division, Allied Chemical Corp. 119
National Distillers and Chemical Corporation, U. S. Industrial Chemicals Co. Division 110A-B
National Drying Machinery Co., The 43
National Starch Products Inc., Amyline Starch Division 91
National Tube Division, United States Steel Corporation 24
Neptune Meter Company 136
Newark Wire Cloth Company 122
Niagara Blower Company 70
Niagara Filters 114-115
North American Car Corporation 39
Norwalk Company, Inc. 32

O

Orbit Valve Company 118
Oxy-Catalyst, Inc. 97

P

Palmer Thermometers, Inc. 136
Panalarm, Division of Panellit, Inc. 70
Parker Fittings and Hose Division, A Division of Parker-Hannifin Corporation 198
Parker Seal Company, A Division of Parker-Hannifin Corporation 162
Penberthy Manufacturing Company, Division Buffalo-Eclipse Corporation 200
Pennsylvania Fluorocarbon Co., Inc. 152
Pennsylvania Pump and Compressor Co. 216
Petreco Division, Petrolite Corporation 177
Petrolite Corporation, Petreco Division 177
Petrometer Corporation 190

Pfaudler Co., The, A Division of Pfaudler Permutit Inc. 171
Pioneer Rubber Co., The 184
Pitt-Consol Chemical Company A Subsidiary of Consolidation Coal Company 90
Pittsburgh Coke & Chemical Co., Activated Carbon Division 5
Pittsburgh Lectrodryer Division, McGraw-Edison Company 15
Powell Pressed Steel Company, The 189
Pressed Steel Tank Company 218
Propellair, Division of Robbins & Myers, Inc. 76

R

Raybestos-Manhattan, Inc., Packing Division 194
Raybestos-Manhattan, Inc., Plastic Products Division 214
Republic Steel, Steel and Tubes Division 156
Resistoflex Corporation 113
Rietz Manufacturing Co. 48
Robinson Air-Activated Conveyor Systems, A Division of Morse Boulger Destructor Co. 204
Rockwell Company, W. S. 168, 212
Rockwell Manufacturing Co. 147
Ross & Son Company, Inc., Charles 194
Rust Industrial Co., Inc. 205

S

Safety Industries, Inc., Entoleter Division 60
Sandvik Steel, Inc., Steel Belt Conveyor Department 173
Selas Corporation of America 206
Sel-Rex Corporation, Rectifier Division 77
Sharples Corporation, The 3
Shriver & Company, Inc., T. 210
Sigmamotor, Inc. 80
Sindar Corporation 211
Smith Corporation, A. O., Harvestore Products 53
Snap-Tite, Inc. 149
Southwestern Engineering Company 58
Southwestern Supply and Machine Works 42
Spray Engineering Company 209
Square D Company, Milwaukee Division 183
Steel and Tubes Division, Republic Steel 156
Stainless and Strip Division, Jones & Laughlin Steel Corporation 109
Stephens-Adamson Mfg. Co., Engineering Division 57
Sterling, Fleischman Co. 199
Strahman Valves, Inc. 75
Struthers Wells Corporation 148
Sturtevant Co., P. A. 120
Sturtevant Mill Co. 112
Swartwout Co., The 8
Swenson Evaporator Co., A Division of Whiting Corporation 187

T

Tamms Industries Co. 10, 97
Taylor Instrument Companies 138-139
Technicon Controls, Inc. 145
Tennessee Coal & Iron Division, United States Steel Corporation 24
Tennessee Corporation 92
Thayer Scale Corp. 51
Thermo Electric Co., Inc. 210
Titeflex Incorporated 13
Toledo Scale, Division of Toledo Scale Corporation 40
Tolhurst Centrifugals 114-115
Toteline 54
Towmotor Corporation 45
Trent Inc. 76
Tube Turns Plastics, Inc. 16

U

U. S. Electrical Motors Inc. 107
U. S. Flexible Tubing Co. 14
U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation 110A-B
U. S. Stoneware 132-133
United States Gauge, Division of American Machine and Metals, Inc. 143
United States Steel Corporation 24
United States Steel Export Company, United States Steel Corporation 24
United States Steel Supply Division, United States Steel Corporation 24
Universal Road Machinery Co., Rubert M. Gay Division 52

V

Van Gorp Manufacturing, Inc. 10
Vapor Heating Corporation 21
Viking Pump Company 60
Vogt Machine Co., Henry 121
Vulcan Containers Inc. 46

W

Warrick Co., Charles F. 80
Western Precipitation Corporation 167
Western States Machine Company, The 211
Weston Instruments, Division of Daystrom, Inc. 10
Whiting Corporation, Swenson Evaporator Company Division 187
Wiegand Company, Edwin L. 150
Wilson, Inc., Thomas C. 104
5th World Petroleum Congress Exposition 102

Y

Yarnall-Waring Company 78
Yeomans 204
Young Radiator Company 186

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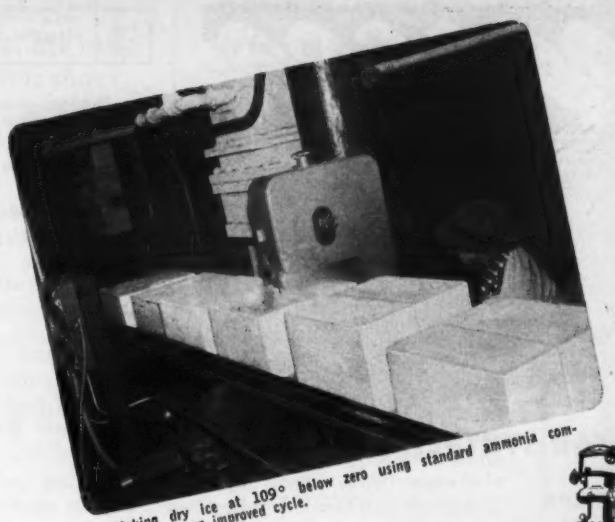
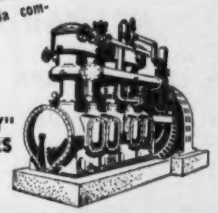


Making dry ice at 109° below zero using standard ammonia compressors in an improved cycle.

"HEAVY DUTY" COMPRESSORS



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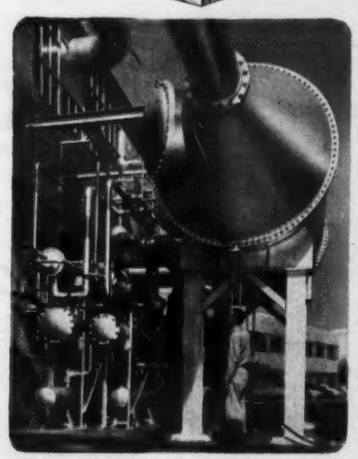
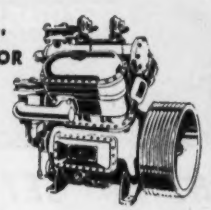


Cooling air under pressure for supersonic speed tests.

"ECLIPSE" COMPRESSOR



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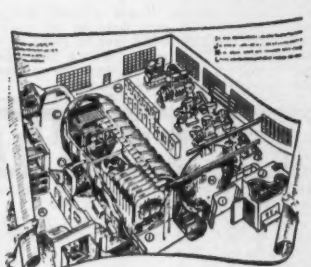

All-weather Laboratory built for U. S. Army. Uses 3-Stage compressors, mantains Arctic, tropic and stratospheric conditions.

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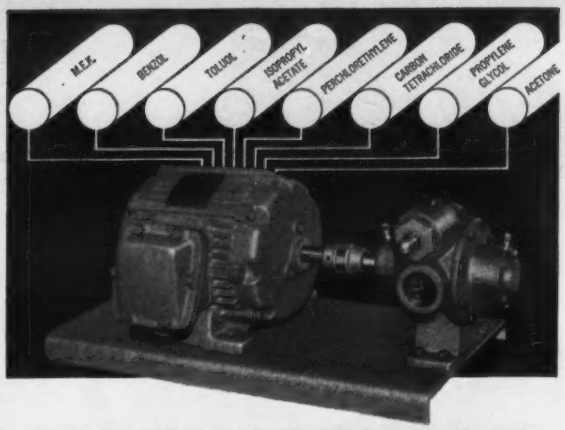

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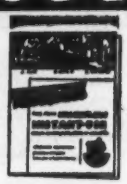

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that's interesting

Thought-provoking slants on projects and products

Just press package top to get daily vitamins

A plastic-coated glass pressurized container is a handy dispenser for a new liquid multi-vitamin product. The product, called Viterra Pediatric, is packaged under nitrogen and dispensed with a metered-flow valve.

The nylon, polyethylene, and stainless steel valve assembly squirts out the exact daily dose of 0.6 cc orange liquid vitamins with each press of the white polyethylene top.

False-alarmers caught greenhanded

There's no need to catch fire false-alarmers red-handed since the development of a special coating for fire-alarm boxes. A non-injurious phosphorescent paste containing a lanolin and zinc compound is applied to the alarm box. Although invisible to the naked eye, the preparation leaves a film on the culprit's hand that glows green when exposed to ultraviolet rays. The film will remain on the hands for as long as 30 days, even after repeated washing.

Navy commissions ship for missile launching

The USS Observation Island, the Navy's first mobile missile launching vessel is fully equipped to handle the Fleet Ballistic Missile. Commissioning of the ship marked the culmination of years of research and development and many months of fabrication and installation of precision electronic equipment.

The complex instrumentation system installed aboard the vessel enables engineers and technicians to evaluate Polaris missile firing preparations and launchings with an accuracy of observation never before possible for firings at sea.

ELECTRONICS-TIME

Lumenite

AUTOMATIC CONTROLS

- ELECTRONIC LIQUID LEVEL
- INDUSTRIAL TIMERS
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- ELECTRONIC SWITCHES

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LT—Time Switches	FL—Liquid Level	ITC—Ice Thickness
PC—Program Clocks	FM—Milk Level	BH—Boiler Level
CR—Cycle Repeaters	FN—Nonconductive Liquid	MV—Motorized Sanitary Valves
R—Time Delay Relay	RMC—Automatic Reset	IT—Interval Timers

LAS—Auto-Lawn Sprinklers LEE—Photo-electronic Relays-Counters, Etc.

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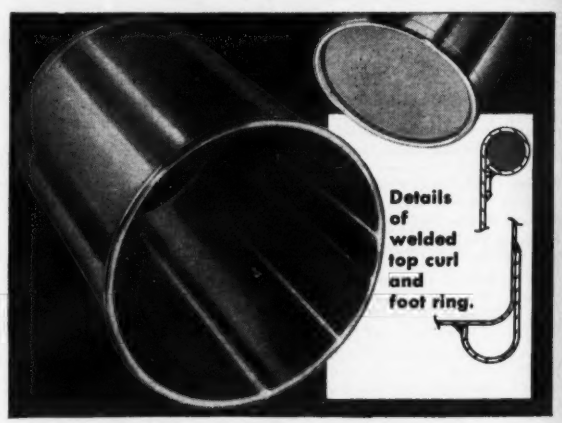

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- Seamless type construction
- Made to resist years of hard service
- 30-, 55-gal. sizes—8 models; 2 types of covers available
- Plain and soldered-crevice models for less critical service

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Pressed Steel Tank Company

Manufacturer of Hackney Products

1463 S. 66th Street, Milwaukee 14, Wisconsin

Branch offices in principal cities

CONTAINERS AND PRESSURE VESSELS FOR GASES LIQUIDS AND SOLI

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MAY 1959

☐ 1523	☐ 1573	☐ 1623	☐ 1673	☐ 1723	☐ 1773
☐ 1524	☐ 1574	☐ 1624	☐ 1674	☐ 1724	☐ 1774
☐ 1525	☐ 1575	☐ 1625	☐ 1675	☐ 1725	☐ 1775
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☐ 1531	☐ 1581*	☐ 1631	☐ 1681	☐ 1731	☐ 1781
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☐ 1565	☐ 1615	☐ 1665	☐ 1715	☐ 1765	☐ 1815
☐ 1566	☐ 1616	☐ 1666	☐ 1716	☐ 1766	☐ 1816
☐ 1567	☐ 1617	☐ 1667*	☐ 1717	☐ 1767	☐ 1817
☐ 1568	☐ 1618	☐ 1668	☐ 1718	☐ 1768*	☐ 1818
☐ 1569	☐ 1619*	☐ 1669*	☐ 1719	☐ 1769	☐ 1819
☐ 1570*	☐ 1620	☐ 1670	☐ 1720	☐ 1770	☐ 1820
☐ 1571	☐ 1621	☐ 1671	☐ 1721	☐ 1771*	☐ 1821
☐ 1572	☐ 1622	☐ 1672	☐ 1722	☐ 1772	☐ 1822

Use this space for writing in specific literature or product designation when you check a number with an asterisk (*) in accompanying list. Repeat the key number from that list, and follow it with specific bulletin number (or title), or product name, as it appears in article or advertisement. PLEASE TYPE OR PRINT.

Key No.	Description

READER SERVICE SLIP Continued from reverse side of this sheet **MAY 1959**

☐ 1823	☐ 1868	☐ 1913	☐ 1958	☐ 2003	☐ 2048
☐ 1824	☐ 1869	☐ 1914	☐ 1959	☐ 2004	☐ 2049
☐ 1825	☐ 1870	☐ 1915	☐ 1960	☐ 2005	☐ 2050
☐ 1826	☐ 1871	☐ 1916	☐ 1961	☐ 2006	☐ 2051
☐ 1827	☐ 1872	☐ 1917	☐ 1962	☐ 2007	☐ 2052
☐ 1828	☐ 1873	☐ 1918	☐ 1963	☐ 2008*	☐ 2053
☐ 1829	☐ 1874	☐ 1919	☐ 1964	☐ 2009	☐ 2054
☐ 1830	☐ 1875	☐ 1920	☐ 1965	☐ 2010	☐ 2055
☐ 1831	☐ 1876	☐ 1921	☐ 1966	☐ 2011	☐ 2056
☐ 1832	☐ 1877	☐ 1922	☐ 1967	☐ 2012	☐ 2057
☐ 1833	☐ 1878	☐ 1923	☐ 1968	☐ 2013	☐ 2058
☐ 1834	☐ 1879	☐ 1924	☐ 1969	☐ 2014	☐ 2059
☐ 1835	☐ 1880	☐ 1925	☐ 1970	☐ 2015	☐ 2060
☐ 1836*	☐ 1881	☐ 1926	☐ 1971	☐ 2016	☐ 2061
☐ 1837	☐ 1882	☐ 1927	☐ 1972	☐ 2017	☐ 2062
☐ 1838	☐ 1883	☐ 1928	☐ 1973	☐ 2018	☐ 2063
☐ 1839	☐ 1884	☐ 1929	☐ 1974	☐ 2019	☐ 2064
☐ 1840	☐ 1885*	☐ 1930	☐ 1975	☐ 2020	☐ 2065
☐ 1841	☐ 1886*	☐ 1931	☐ 1976	☐ 2021	☐ 2066
☐ 1842	☐ 1887	☐ 1932	☐ 1977	☐ 2022	☐ 2067
☐ 1843	☐ 1888	☐ 1933	☐ 1978*	☐ 2023	☐ 2068
☐ 1844	☐ 1889	☐ 1934	☐ 1979	☐ 2024	☐ 2069
☐ 1845	☐ 1890	☐ 1935	☐ 1980	☐ 2025	☐ 2070
☐ 1846	☐ 1891	☐ 1936	☐ 1981	☐ 2026	☐ 2071
☐ 1847	☐ 1892	☐ 1937	☐ 1982	☐ 2027	☐ 2072
☐ 1848	☐ 1893	☐ 1938	☐ 1983	☐ 2028	☐ 2073
☐ 1849	☐ 1894*	☐ 1939	☐ 1984	☐ 2029	☐ 2074
☐ 1850	☐ 1895	☐ 1940	☐ 1985	☐ 2030	☐ 2075
☐ 1851	☐ 1896	☐ 1941	☐ 1986	☐ 2031	☐ 2076
☐ 1852	☐ 1897	☐ 1942	☐ 1987	☐ 2032	☐ 2077
☐ 1853	☐ 1898	☐ 1943	☐ 1988	☐ 2033*	☐ 2078
☐ 1854	☐ 1899	☐ 1944	☐ 1989	☐ 2034	☐ 2079
☐ 1855	☐ 1900	☐ 1945	☐ 1990	☐ 2035	☐ 2080
☐ 1856	☐ 1901	☐ 1946	☐ 1991	☐ 2036	☐ 2081
☐ 1857*	☐ 1902	☐ 1947	☐ 1992	☐ 2037	☐ 2082
☐ 1858	☐ 1903	☐ 1948	☐ 1993	☐ 2038	☐ 2083
☐ 1859	☐ 1904	☐ 1949	☐ 1994	☐ 2039	☐ 2084
☐ 1860	☐ 1905	☐ 1950	☐ 1995	☐ 2040	☐ 2085*
☐ 1861	☐ 1906	☐ 1951	☐ 1996*	☐ 2041	☐ 2086
☐ 1862	☐ 1907	☐ 1952	☐ 1997	☐ 2042	☐ 2087*
☐ 1863	☐ 1908	☐ 1953	☐ 1998	☐ 2043	☐ 2088
☐ 1864	☐ 1909*	☐ 1954	☐ 1999	☐ 2044	☐ 2089
☐ 1865	☐ 1910	☐ 1955	☐ 2000	☐ 2045	☐ 2090
☐ 1866	☐ 1911	☐ 1956	☐ 2001	☐ 2046	
☐ 1867	☐ 1912	☐ 1957	☐ 2002	☐ 2047	

Be Sure To Give Your Address

*On all numbers having an asterisk (*) after them, please identify the exact product or piece of literature in one of the blank columns on this and front page. Write in the key number, as given on the slip, followed by the bulletin number (or title), or name of product in which you are interested.

Use this space for writing in specific literature or product designation when you check a number with an asterisk (*) in accompanying list. Repeat the key number from that list, and follow it with specific bulletin number (or title), or product name, as it appears in article or advertisement. PLEASE TYPE OR PRINT.

Key No.	Description

Please type or print and be sure to give your title and main product of company

Name ..... Title .....

Company ..... Main Product .....

Street Address of Company .....

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CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations.

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Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So, no matter what your particular field you will find suitable dato to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data" Section. It begins on page 71.

For more information on product at right, specify 2089 see information request blank opposite last page.

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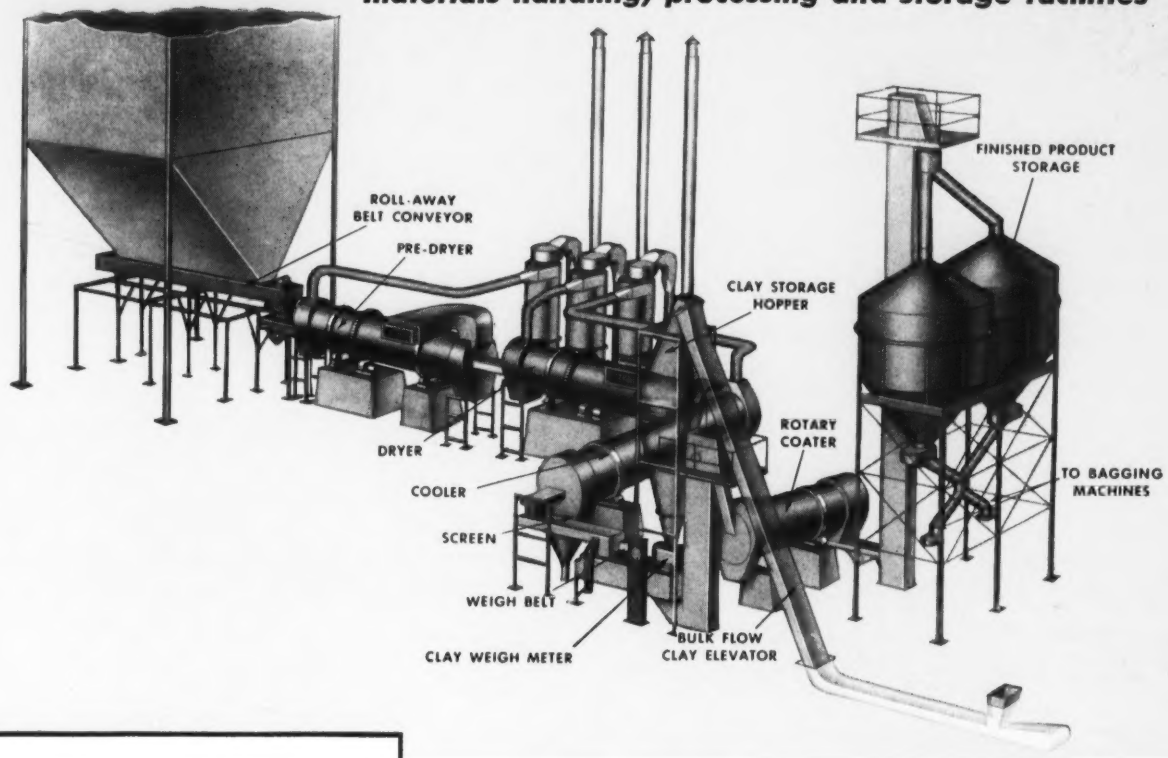

AMMONIUM NITRATE FERTILIZER DRYING AND PROCESSING PLANT

Prills formed by cooling concentrated ammonium nitrate solution (NH_4NO_3) sprayed into the top of a 150 foot prill tower (not shown) are fed out of the bottom of the tower with a belt conveyor (which can be rolled away for cleaning) and passed successively through a rotary pre-dryer and dryer, both of Bartlett-Snow's Style J steam heated design. Prills discharged from the dryer at about 170° F. and .2% to .4% moisture are passed through an air swept rotary cooler that lowers their temperature to 110° F. They are then screened, powdered clay added, and passed through a rotary blender. The finished pellets are elevated to storage preparatory to bagging.

• Bartlett-Snow offers more than 60 years experience in engineering, fabricating and erecting of dryers, coolers, calciners and other continuous and batch heat processing equipment. Our research laboratory in Cleveland provides facilities for determining heat sensitivity, preferred velocities, retention time and other needed physical and chemical reactions of the material . . . can even produce actual samples of the treated product before the full plant equipment is built.

We are well known also as builders of bucket elevators; rotary screens; bins and gates; apron, screw, belt and flight conveyors and other materials handling equipment. Thus we can supply — at no higher first cost — all the equipment needed for an entire system including all accessory facilities, assuring early completion of the project and fully coordinated operation as planned. Let us help you with your next job. *Get full details!*

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Material Handling and Processing Division

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The new corrosion film everyone is talking about!

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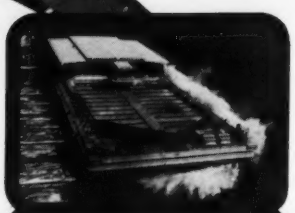
Here is an authoritative film that answers many questions on the theory of corrosion and demonstrates methods by which it is controlled. Presented in color and sound, it ranges from the formation of anodes and cathodes through the use of galvanizing, inhibitors, metallizing, cathodic protection, alloys and protective coatings. You will see how many corrosion problems in industries such as yours are being solved by Dimetcote, a one-coat zinc silicate protective coating. This film will be well worth 19 minutes of your time. To arrange a showing for you and your associates, or to learn when it will be shown in your area, contact any of the Amercoat offices listed below.



Typical audience reactions:

Bishop, Tex.—"Planning fair-sized test after seeing this film."

Louisville, Ky.—"Answers many questions. Second showing arranged."

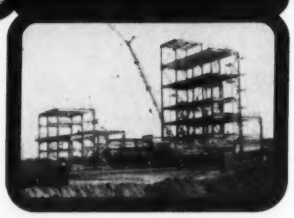
Cincinnati, Ohio—"Key personnel evidenced considerable interest."

Netherlands Antilles—"Both shows led to 45-minute discussions."

Fairport, Ohio—"Very interesting. Will try methods shown."

Las Piedras, Venezuela—"Putting ideas to work in near future."

Bartlesville, Okla.—"Viewed by 42 key men from five divisions."



Answers these and other questions:

What produces electrolytic corrosion?

What factors favor hot-dip galvanizing?

How important is surface preparation?

Can a coating survive a tank fire?

Can rust in tankers be controlled?

Can a coating offer cathodic protection?

What are the corrosion problems on offshore rigs?

What are the advantages of zinc silicate?

How can chemical plants cut painting costs?

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113

Check 2090 opposite last page

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